







CUSTOMER QUESTIONNAIRE

To the Reader of This Instruction Manual:

Motorola is engaged in a continuous program of improving its instruction literature. We believe that you can aid us in this p ogram, so that we in turn can better help you service our equipment. To foster these aims, would you please answer the following questions:

-First-	SCHEMATIC DIAGRAMS AND CABLING DIAGRAMS	- Fin
, 014	1. Are accurate and easy to follow	70
	2. Contain minor errors	
	3. Contain major errors	
ш	4. Are difficult to follow	
68P85901D80-F	If you have checked any box except 1, please tell us what schematic diagrams, or portions thereof, were at fault, or enter other comments.*	
		_
	TEXT	
	1. Easy to follow — helps to service equipment	
	2. Would like more information on*	
Fold		Fo
	3. Some instruction sections are too long or superfluous such as*	
	4. Other comments*	
	THE PROPERTY OF THE PROPERTY O	
		_
	The state of the s	

PARTS LIST	
1. Are comp	plete and accurate
2. Would lik	e more information as follows*
	ASSESSMENT LEADING COMMUNICATION
ILLUSTRATIONS IN G	ENERAL
1. Are comp	plete and accurate
2. Want mor	re illustrations such as*
3. Some are	superfluous such as*
The name of my in	estruction manual is:
The part number of	f my instruction manual is:
(This number will b	My name is
	Company
	Address
	CityStateZip
	Phone No. (include area code)
Whenever possible, give or part No. of instruction	complete model No. of equipment, and part No. of diagram n section. This information is important.
No Pos Stan Necess Mailed United	mp ary if in the by
	BUSINESS REPLY MAIL First Class Permit No. 75, Roselle, Illinois
	BUSINESS REPLY MAIL First Class Permit No. 75, Roselle, Illinois ENGINEERING PUBLICATIONS DEPT. MOTOROLA, INC. 1301 E. Algonquin Road
	1301 E. Algonquin Road Schaumburg, Illinois 60172

MOTOROLA

"MOCOM • 70"

MOBILE FM TWO-WAY RADIO

450-470 MHz
25 W RF POWER

AND

470-512 MHz

10/25/50 W E.R.P.





Communications Division

SPECIFICATIONS

GENERAL

GENERAL			
MAXIMUM	RECEIVE	13.8 V dc	
BATTERY	(STANDBY)	450 mA	
DRAIN*	TRANSMIT	13.6 V dc 14 Amperes	
*Drain figure	s for negative ground	only, add .080 amp for po	ositive ground operation.
FREQUENCY	RANGE	450-512 MHz	
METERING		equivalent series resist	croampere meter with 20,000 ohms cance or Motorola portable test set can reuits essential to tuning and checking.
DIMENSIONS		4" high x 10-3/4" wide	x 16-1/2" long
WEIGHT		Approximately 25 lbs (sapproximately 50 lbs).	hipping weight including accessories:
TRANSMITTE	CR CR	450-470 MHz	470-512 MHz
RF POWER O	UTPUT	25 watts	10/25/50 W E.R.P.
OUTPUT IMP	EDANCE	50 ohms	•
SPURIOUS & 1	HARMONIC	Spurious and harmonics	more than 60 dB below carrier (per
EMISSIONS		EIA spec RS-152B, Par	. 4 and 5.
FREQUENCY	STABILITY	frequency within ±. 0005	ated quartz crystal maintains oscillator % of reference frequency from -30°C C reference) and ±. 0005% with a 20% on.
MODULATION	1	16F3: ±5 kHz for 100% a	at 1000 Hz @450-512 MHz
AUDIO SENSI	TIVITY	0.1 volt ±3 dB for 3.0 k	Hz deviation at 1000 Hz
FM NOISE		-70 dB below ±3.0 kHz	deviation at 1000 Hz
AUDIO RESPO	ONSE	+1, -3 dB of 6 dB/octav 300 to 3000 Hz	e pre-emphasis characteristic from
AUDIO DISTO	RTION	Less than 3% at 1000 Hz	for ±3.0 kHz deviation
RECEIVER			
CHANNEL SP.	ACING	25 kHz	
SELECTIVITY	(EIA SINAD)	-90 dB at 25 kHz, 450-47	0 MHz -88 dB at 25 kHz, 470-512 MHz
	TERMODULATION	-80 dB at 25 kHz (-75 d	
EIA MODULA	TION ACCEPTANCE	±7.0 kHz minimum	
		I ase than 0 5 microvol	t (less than 0.25 microvalt with

CHANNEL SPA	ACING	25 kHz
SELECTIVITY	(EIA SINAD)	-90 dB at 25 kHz, 450-470 MHz -88 dB at 25 kHz, 470-512 MHz
EIA SINAD INT	TERMODULATION	-80 dB at 25 kHz (-75 dB with preamplifier)
EIA MODULAT	TION ACCEPTANCE	±7.0 kHz minimum
CDAIGIONAL TON	20 dB QUIETING	Less than 0.5 microvolt (less than 0.25 microvolt with preamplifier)
SENSITIVITY	EIA SINAD	Less than 0.35 microvolt (less than 0.18 microvolt with preamplifier)
FREQUENCY S	STABILITY	A temperature compensated quartz crystal maintains oscillator frequency within ±.0005% of reference frequency from -30°C to +60° \(\) ambient (+25°C reference) and ±.0005% with a 20% primary voltage deviation.
SPURIOUS & II	MAGE REJECTION	More than 100 dB
SQUELCH		Carrier squelch; noise compensated type, adjustable sensitivity, threshold sensitivity of 0.25 microvolt. "Private-Line" tone-coded squelch; also includes a tone-operated squelch circuit, adjustable sensitivity, threshold sensitivity of 0.25 microvolt. (Squelch threshold sensitivities are 0.15 microvolt with preamplifier)
AUDIO OUTPU	Т	5 watts to a 3.2-ohm load measured at the receiver output at less than 5% distortion @ 1000 Hz
AUDIO RESPO	NSE	+2, -8 dB of 6 dB/ octave de-emphasis characteristic from 300 to 3000 Hz

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

FCC LICENSE DESIGNATIONS

2002	TOBINDE DEDICATION	OIND
Frequency Range	Single Frequency	Multiple Frequency
450-470 MHz	CC4111	CC4112
470-494 MHz	CC4128-1	CC4129-1
494-512 MHz	CC4128-2	CC4129-2

FCC RECEIVER DESIGNATIONS

Frequency Capability	Standard	With Preamplifier
Single	RC0057	RC0058
Multiple (2-4 & T2-R1)	RC0059	RC0060
Eight	RC0061	Not Available

EPS-18788-0

FOREWORD

1. SCOPE OF MANUAL

This manual is intended for use by experienced technicians familiar with similar types of equipment. It contains all service information required for the equipment described and is current as of the printing date. Changes which occur after the printing date are incorporated by Instruction Manual Revisions (SMR). These SMR's are added to the manuals as the engineering changes are incorporated into the equipment.

2. MODEL AND KIT IDENTIFICATION

Motorola equipments are specifically identified by an overall model number on the nameplate. In most cases, assemblies and kits which make up the equipmentalso have kit model numbers stamped on them. When a production or engineering change is incorporated, revision suffix numerals are added to the affected kit model number. For example, a TLN4448A becomes a TLN4448A-1 with the first revision, TLN4448A-2 with the second revision, etc.

As diagrams are updated, information about the change is incorporated into a revision column. This revision column appears in the manual up issue next to the parts list or, in some cases, on the diagram. It lists the reference number, part number, and description of the parts removed or replaced when the suffix number changed. With this information, the technician can find the information for the current version, and any previous version, of the equipment covered by the manual.

3. SERVICE

Motorola's National Service Organization offers the finest nationwide installation and maintenance program available. The organization includes over 800 strategically-located Motorola Service Stations (MSS) each having a trained staff of FCC-licensed technicians.

These MSS's are independently owned and operated, and franchised by Motorola to service their customers. Such service may be purchased as required, or may be contracted for on a calendar-period basis.

The administrative forces of area and district service managers, and district service representatives, are in the direct employ of Motorola.

Should you wish to purchase a service contract for your Motorola equipment, contact your Motorola Service Representative, or write to:

National Service Manager Motorola Communications Division 1301 E. Algonquin Road Schaumburg, Ill. 60172

4. REPLACEMENT PARTS ORDERING

Motorola maintains a number of parts offices strategically-located throughout the United States. These facilities are staffed to process parts orders, identify part numbers, and otherwise assist in the maintenance and repair of Motorola Communications Division products.

Orders for all parts except crystals, channel elements, and "Vibrasender" and "Vibrasponder" resonant reeds should be sent to the nearest area parts center. Orders for instruction manuals should also be sent to the area parts and service center.

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, 'and sufficient description of the desired component to identify it.

Orders for crystals, channel elements, active filters, code plugs, and reeds should be sent directly to the factory address listed below. Crystal and channel element orders should specify the crystal or channel element type number, crystal and carrier frequency, and the chassis model number in which the part is used.

Orders for active filters, code plugs, "Vibrasender" and "Vibrasponder" resonant reeds should specify type number and frequency, and should identify the owner/operator of the communications system in which these items are to be used.

68P81025E81-B

5. ADDRESSES

5.1 GENERAL OFFICES

MOTOROLA INC.
Communications Division Parts Dept.
1313 E. Algonquin Rd.,
Schaumburg, Illinois 60172
Phone: 312-397-1000
Executive Offices: 1301 E. Algonquin Rd.,
Schaumburg, Illinois 60172

5.2 U.S. ORDERS

WESTERN AREA PARTS

1170 Chess Drive, Foster City, San Mateo, California 94404 Phone: 415-349-3111 TWX: 910-375-3877

MIDWEST AREA PARTS

10 N. North Ave., Lombard, Ill. 60148 Phone: 312-620-3000 TWX: 910-693-1592

MID-ATLANTIC AREA PARTS

6701 Elkridge Landing Road, Linthicum, Maryland 21090 Phone: 301-796-8600

EAST CENTRAL AREA PARTS

12995 Snow Road, Parma, Ohio 44130 Phone: 216-267-2210 TWX: 810-421-8845

EASTERN AREA PARTS

85 Harristown Road, Glen Rock, New Jersey 07452 Phone: 201-447-4000 • TWX: 710-988-5602

PACIFIC SOUTHWESTERN AREA PARTS

2333 Utah Avenue, El Segundo, California 90245 Phone: 213-644-1101 TWX: 910-348-6278

SOUTHWESTERN AREA PARTS

3320 Belt Line Road, Dallas, Texas 75234 Phone: 214-241-2151 TWX: 910-860-5505

SOUTHEASTERN AREA PARTS

5096 Panola Industrial Blvd. Decatur, Georgia 30032 Phone: 504-981-9800 TWX: 810-751-8300

5.3 CANADIAN ORDERS

CANADIAN MOTOROLA ELECTRONICS COMPANY

Parts Department 3125 Steeles Avenue, East Willowdale, Ontario Phone: 516-499-1441. TWX: 610-492-2713 Telex: 02-29944LD

5.4 ALL COUNTRIES EXCEPT U.S.

ALL COUNTRIES EXCEPT U.S. AND CANADA

MOTOROLA, INC. OR MOTOROLA AMERICAS, INC.

International Parts
1313 E. Algonquin Road
Schaumburg, Illinois 60172 U.S.A.
Phone: 312-397-1000

TWX: 910-693-1592 or 1599 Telex: 722443 or 722424

Cable: MOTOL

5.5 FACTORY ADDRESS FOR CRYSTAL, CHANNEL ELEMENT, ACTIVE FILTER, CODE PLUGS AND RESONANT REED ORDERS

AIR MAIL ORDERS

Motorola, Inc.

Component Products Sales & Service

P.O. Box 66191

O'Hare International Airport

Chicago, Ill. 60666

REGULAR MAIL ORDERS AND CORRESPONDENCE

Motorola, Inc. Component Products Sales & Service 2553 Edgington Street Franklin Park, Illinois 60131

CONTENTS

<u>SECTION</u> <u>NUM</u>	BER
Specifications	i
Foreword iv, v	
Radio Set Model Charts viii-	viii
DESCRIPTION	
Introduction	
Transmitters	
Receivers	
"Digital Private-Line" and Tone "Private-Line" Squelch Models 1	
Netting Features	
Housing	
Accessories	
Optional Accessories	
INSTALLATION AND OPERATION	
Installing the Radio Set	
Operating Instructions	
Low Current Drain Modification	
THEORY OF OPERATION	
Functional Operation	
Functional Operation	
Receiver	
Transmitter	
Receiver Preamplifier	
Ground Reversing Kit	
Time-Out Timer	
Automatic Pilot Light Dimmer Circuit	
MAINTENANCE	
Doggerman ded Test Province	
Transmittan Carriaina	
UDigital Duisate Timell Cinesit C.	
Front Donal O Was I and D	
Front Panel & Key Lock Removal	
ALIGNMENT CHARTS	
Transmitter Alignment Procedure	
Receiver Alignment Procedure	
DIAGRAMS AND CIRCUIT BOARD DETAILS	
Control Head used in 1 & 4-Frequency Radio Sets, Schematic	
Diagram and Parts List	
Control Head used in 2-Frequency Radio Sets. Schematic	
Diagram and Parts List	
Control Heads with Dimmer used in 2-Frequency Radio Sets.	
Schematic Diagram and Parts List	
Control Heads with Dimmer used in 1 & 4-Frequency Radio Sets.	
Schematic Diagram and Parts List	
Dash Mount Dual-Purpose Control Heads Schematic Diagram	
and Parts List	
Filot Light Dimmer Circuit Board Detail and Parts List	
runk Mount Dual-Purpose Control Heads and Cabling	
Schematic Diagram and Parts List	

SEC'	TION			NUMBER
	Trunk Mount Cabling Schematic Diagram and Parts List			55
	Rr Preamplifier Schematic Diagram and Parts List			E 7
	RF Deck Circuit Board Detail.	•	•	57
	Injection Tripler Circuit Board Detail .	•	•	40
	"Digital Private-Line" Squelch Encoder-Decoder Schematic	•	•	60
	Diagram, Circuit Board Detail and Parts List			4.1
	"Digital Private-Line" Two-Code Adapter Schematic Diagram,	•	•	01
	Circuit Board Detail and Parts List			(2
	"Private-Line" Encoder and Decoder Circuit Board Detail	•	•	0.5
	Power Amplifier Circuit Board Detail	•	۰	65
	Power-Temperature Monitor Circuit Board Detail	•	•	66
	Power Tripler Parts Location Dotail	•	•	67
	Power Tripler Parts Location Detail	•	•	68
	Board Detail and Parts List			
	Board Detail and Parts List	•	•	69
	and Parte List			
	and Parts List	•	•	71
	"B" Suffix Main Board Models Circuit Board Detail	•	٠	73
	Transmitter-Receiver Schematic & Intercabling Diagram and Parts List			75-78
	Heatsink & Housing Detail and Parts List	•	•	79
	Control Head Escutcheon and Housing Detail	•		80
PEDI	IICTION OF INTERESPINA NOISES IN MORE - COMPANY			
NLD.	UCTION OF INTERFERING NOISES IN MOBILE OPERATION	•		68P81023E42
	Introduction	•		51-1
	Noise Reduction	•	•	51-1
ANT	I-SKID BRAKING PRECAUTIONS			/ O.D.O.I. O.O.D.
	General	•	•	68P81023E43
	Installation Suggestions	•	•	52-1
	Installation Suggestions	•	•	
				52_1

MODEL CHART FOR JS0-512 MH= IS W AND 25 W RF POWER "MOCOM*-70" MOBILE FM TWO-WAY RADIO "DIGITAL PRIVATE-LINE" CODED SQUELCH BASIC RADIO MODELS (LATER VERSION) CODE:		MOTOROLA	TRANSMITTER RF POWER	15 W	15 W	15 W	15 W	25 W	25 W	25 W	
#\$6-512 MH# 15 W AND 25 W RF POWER "MOCOM*-70" MOBILE FM TWO-WAY RADIO "DIGITAL PRIVATE-LINE" CODED SQUELCH BASIC RADIO MODELS (ILATER VERSION) CODE:		MODEL CHART									
"MOCOM" *70" MOBILE FM TWO-WAY RADIO "DIGITAL PRIVATE-LINE" CODED SQUELCH BASIC RADIO MODELS (LATER VERSION) CODE: X = ONE ITEM SUPPLIED ONE ITEM SUPPLIED DEPENDENT UPON FRE- QUENCY RANGE 0 = ONE ITEM SUPPLIED FOR FIVE OR LESS RADIO SETTS E = NUMBER INDICATES QUANTITY SUPPLIED VERY RANGE 1 = NUMBER INDICATES QUANTITY SUPPLIED ITEM DESCRIPTION TLEE-592B CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz TLEE-593B CIRCUIT BOARD MOLITI-FREQUENCY) 450-470 MHz TLEE-593B CI		FOR		ı					Н		
CODE: X		450-512 MHz 15 W AND 25 W RF POWER	. Si	ı				۱			
CODE: X		"MOCOM * •70" MOBILE FM TWO-WAY RADIO	VER	ı				ı	Н		
CODE: X		"DIGITAL PRIVATE-LINE" CODED SQUELCH	CEL	-	2	4	-	-	2	4	
CODE: X = ONE ITEM SUPPLIED ONE ITEM SUPPLIED DEPENDENT UPON FRE- QUENCY RANGE 0 = ONE ITEM SUPPLIED FOR FIVE OR LESS RADIO SETS 2 = NUMBER INDICATES QUANTITY SUPPLIED DESCRIPTION TLE6352E CIRCUIT BOARD SINGLE-FREQUENCY) 450-470 MHz TLE6591B CIRCUIT BOARD SINGLE-FREQUENCY) 470-494 MHz TLE6591B CIRCUIT BOARD MULTIFFER (50-470 MHz) TLE6151B CIRCUIT BOARD MULTIFFER (50-470 MHz) TLE61552A POWER AMPLIFER (450-470 MHz) TLE61554A POWER AMPLIFER (450-470 MHz) TLE61555A POWER AMPLIFER (450-470 MHz) TLE6155B CIRCUIT ROARD MULTIFFER (50-470 MHz) TLE6155B CIRCUIT BOARD MULTIFFER (50-470 MHz) TLE6155C TLE6155C CONTROL MULTIFFER (450-470 MHz) TLE6155C TLE6155C CONTROL MULTIFFER (450-470 MHz) TLE6155C TLE615C CONTROL MULTIFFER (450-470 MHz) TLE615C TLE615C CONTROL MULTIFFER (450-		BASIC RADIO MODELS		ı							
CODE: X		(LATER VERSION)	H	ı				ı	Н		
TEM				ŀ							
DESCRIPTION	COD	E:	ER								
DESCRIPTION	X	= ONE ITEM SUPPLIED	AITT		01	-	2		2	4	7
DESCRIPTION			FRANSA			7					
ITEM	0		() 14								
TLE6592B	2	= NUMBER INDICATES QUANTITY SUPPLIED		П							Î
TLE6592B				4A	4A	1A	4A	4A	4A	AA	AA
TLE6593B			MODEL	U24BBA-6000AA	U24BBA-6300AA	U24BBA-6900AA	U24BBA-6100AA	U34BBA-6000AA	U34BBA-6300AA	U34BBA-6900AA	U34BBA-6100AA
TLE6612B			MODEL	U24BBA-6000AA	U24BBA-6300AA	1724BBA-6900AA	U24BBA-6100AA	U34BBA-6000AA	U34BBA-6300AA	U34BBA-6900AA	U34BBA-6100AA
TLE6614B CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz TFE6153A HARMONIC FILTER (450-470 MHz) TFE6155A HARMONIC FILTER (470-494 MHz) TFE6155A HARMONIC FILTER (494-512 MHz) TLE1552A POWER AMPLIFIER (450-470 MHz) TLE1553A POWER AMPLIFIER (450-470 MHz) TLE1554A POWER AMPLIFIER (470-494 MHz) TLE1554A POWER AMPLIFIER (494-512 MHz) TLE6603A INJECTION TRIPLER (494-512 MHz) TLE6605A INJECTION TRIPLER (494-494 MHz) TLE6573A VARACTOR MULTIPLIER (494-512 MHz) TLE6575A VARACTOR MULTIPLIER (494-512 MHz) TLE6575A VARACTOR MULTIPLIER (470-494 MHz) TLE6583A RECEIVER RF DECK (450-470 MHz) TLE6588A RECEIVER RF DECK (450-470 MHz) TLE6585A RECEIVER RF DECK (470-494 MHz) TLE6585A RECEIVER RF DECK (494-512 MHz) TLA16688A RECEIVER RF DECK (494-512 MHz) TLA16688A RECEIVER RF DECK (470-494 MHz) TLA16688A RECEIVER RF DECK (470-494 MHz) TLE658A TLN4473A CIRCUIT PROTECTION KIT XX	TLE6592B TLE6593B	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz	MODEL	N U24BBA-6000AA	U24BBA-6300AA	1124BBA-6900AA	U24BBA-6100AA	NN U34BBA-6000AA	U34BBA-6300AA	U34BBA-6900AA	U34BBA-6100AA
TFE6154A HARMONIC FILTER (470-494 MHz) TFE6155A HARMONIC FILTER (494-512 MHz) TLE1552A POWER AMPLIFIER (450-470 MHz) TLE1553A POWER AMPLIFIER (470-494 MHz) TLE1554A POWER AMPLIFIER (494-512 MHz) TLE6603A INJECTION TRIPLER (450-470 MHz) TLE6604A INJECTION TRIPLER (494-512 MHz) TLE6573A VARACTOR MULTIPLIER (494-512 MHz) TLE6573A VARACTOR MULTIPLIER (470-494 MHz) TLE6575A VARACTOR MULTIPLIER (494-512 MHz) TLE6583A RECEIVER RF DECK (450-470 MHz) TLE6585A RECEIVER RF DECK (450-470 MHz) TLE6585A RECEIVER RF DECK (470-494 MHz) TLE6585A RECEIVER RF DECK (494-512 MHz) TFN1000AS RECEIVER RF DECK (494-512 MHz) TFN10473A CIRCUIT PROTECTION KIT TLN4476A ANTENNA SWITCH KIT TLN4476A ANTENNA SWITCH KIT TKN6491B INTERCABLE KIT (SINGLE-FREQUENCY) TKN6491B INTERCABLE KIT (SINGLE-FREQUENCY) TKN6492B INTERCABLE KIT (SULTI-FREQUENCY) TKN6491B INTERCABLE KIT (SULTI-FREQUENCY)	TLE6592B TLE6593B TLE6594B TLE6612B	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz	MODEL	NN U24BBA-6000AA	U24BBA-6300AA	1124BBA-6900AA	U24BBA-6100AA	NNN U34BBA-6000AA	U34BBA-6300AA	U34BBA-6900AA	U34BBA-6100AA
TFE6155A HARMONIC FILTER (494-512 MHz) TLE1552A POWER AMPLIFIER (450-470 MHz) TLE1553A POWER AMPLIFIER (470-494 MHz) TLE1554A POWER AMPLIFIER (494-512 MHz) TLE6603A INJECTION TRIPLER (450-470 MHz) TLE6605A INJECTION TRIPLER (470-494 MHz) TLE6505A VARACTOR MULTIPLIER (494-512 MHz) TLE6573A VARACTOR MULTIPLIER (470-494 MHz) TLE6574A VARACTOR MULTIPLIER (470-494 MHz) TLE6575A VARACTOR MULTIPLIER (494-512 MHz) TLE6583A RECEIVER RF DECK (450-470 MHz) TLE6584A RECEIVER RF DECK (470-494 MHz) TLE6585A RECEIVER FILTER X X X X X X X X X X X X X X X X X X X	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz	MODEL	U24BBA-6000AA	U24BBA-6300AA	1124BBA-6900AA	U24BBA-6100AA	U34BBA-6000AA	U34BBA-6300AA	U34BBA-6900AA	U34BBA-6100AA
TLE1553A POWER AMPLIFIER (470-494 MHz) TLE1554A POWER AMPLIFIER (494-512 MHz) TLE6603A INJECTION TRIPLER (450-470 MHz) TLE6604A INJECTION TRIPLER (470-494 MHz) TLE6505A INJECTION TRIPLER (494-512 MHz) TLE6573A VARACTOR MULTIPLIER (450-470 MHz) TLE6575A VARACTOR MULTIPLIER (470-494 MHz) TLE6575A VARACTOR MULTIPLIER (494-512 MHz) TLE6583A RECEIVER RF DECK (450-470 MHz) TLE6584A RECEIVER RF DECK (470-494 MHz) TLE6585A RECEIVER RF DECK (470-494 MHz) TEN1000AS RECEIVER FILTER X X X X X X X X X X X X X X X X X X X	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6154A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz)	MODEL	U24BBA-6000AA	U24BBA-6300AA	V V II24BBA-6900AA	U24BBA-6100AA	NNN U34BBA-6000AA	U34BBA-6300AA	U34BBA-6900AA	U34BBA-6100AA
TLE6603A	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) HARMONIC FILTER (470-495 MHz)	MODEL	N U24BBA-6000AA	VZ4BBA-6300AA	V V V IIZ4BBA-6900AA	N N U24BBA-6100AA	NNN U34BBA-6000AA	U34BBA-6300AA	U34BBA-6900AA	U34BBA-6100AA
TLE6505A INJECTION TRIPLER (494-512 MHz) TLE6573A VARACTOR MULTIPLIER (450-470 MHz) TLE6575A VARACTOR MULTIPLIER (470-494 MHz) TLE6575A VARACTOR MULTIPLIER (494-512 MHz) TLE6583A RECEIVER RF DECK (494-512 MHz) TLE6584A RECEIVER RF DECK (470-494 MHz) TLE6585A RECEIVER RF DECK (494-512 MHz) TNN1000AS RECEIVER RF DECK (494-512 MHz) TNN1000AS RECEIVER FILTER XX	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6154A TFE6155A TLE1552A TLE1552A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) POWER AMPLIFIER (450-470 MHz) POWER AMPLIFIER (470-494 MHz)	MODEL	N N U24BBA-6000AA	V V V V V V V V V V V V V V V V V V V	V V V V V V V V V V V V V V V V V V V	N N U24BBA-6100AA	NNNN U34BBA-6000AA	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	U34BBA-6900AA	U34BBA-6100AA
TLE6574A VARACTOR MULTIPLIER (470-494 MHz) TLE6575A VARACTOR MULTIPLIER (494-512 MHz) TLE6583A RECEIVER RF DECK (450-470 MHz) TLE6584A RECEIVER RF DECK (470-494 MHz) TLE6585A RECEIVER RF DECK (470-494 MHz) TFN1000AS RECEIVER FILTER X X X X X X X X X X X X X X X X X X X	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1553A TLE1554A TLE1603A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) HARMONIC FILTER (494-512 MHz) POWER AMPLIFIER (450-470 MHz) POWER AMPLIFIER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (450-470 MHz)	MODEL	N N N U24BBA-6000AA	UZ4BBA-6300AA	VVVVV	U24BBA-6100AA	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	U34BBA-6900AA	U34BBA-6100AA
TLE6583A RECEIVER RF DECK (450-470 MHz) TLE6584A RECEIVER RF DECK (470-494 MHz) TLE6585A RECEIVER RF DECK (494-512 MHz) TFN1000AS RECEIVER FILTER X X X X X X X X X X X X X X X X X X X	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1554A TLE16603A TLE6604A TLE6605A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) HARMONIC FILTER (494-512 MHz) POWER AMPLIFIER (450-470 MHz) POWER AMPLIFIER (494-512 MHz) INJECTION TRIPLER (450-470 MHz) INJECTION TRIPLER (470-494 MHz) INJECTION TRIPLER (470-494 MHz) INJECTION TRIPLER (470-494 MHz)	MODEL	N N N U24BBA-6000AA	V/V/V/V/V	1124BBA-6900AA	NN NN NO U24BBA-6100AA	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	U34BBA-6900AA	U34BBA-6100AA
TLE6585A RECEIVER RF DECK (494-512 MHz)	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1553A TLE1554A TLE6603A TLE6603A TLE6605A TLE6605A TLE6673A TLE6674A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (450-470 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (450-470 MHz)	MODEL	N N N U24BBA-6000AA	U24BBA-6300AA	1124BBA-6900AA	N N N N N N N N N N N N N N N N N N N	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	U34BBA-6900AA	U34BBA-6100AA
TFN 1000 AS	TLE6592B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1552A TLE16603A TLE6603A TLE6603A TLE6673A TLE6573A TLE6573A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) HARMONIC FILTER (494-512 MHz) POWER AMPLIFIER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (470-494 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (470-494 MHz) RECEIVER RF DECK (450-470 MHz)	MODEL	N N N N N U24BBA-6000AA	VZ4BBA-6300AA	LIZABBA-6900AA	NN NN NN NN U24BBA-6100AA	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	U34BBA-6900AA	U34BBA-6100AA
TLN4476A	TLE6592B TLE6593B TLE6593B TLE6612B TLE6612B TLE6613B TLE6613B TFE6153A TFE6155A TLE1552A TLE1552A TLE1553A TLE1554A TLE6603A TLE6604A TLE6605A TLE6673A TLE6573A TLE6573A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (494-512 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (450-470 MHz)	MODEL	VIN VIN VIABBA-6000AA	V V V V V V V V V V V V V V V V V V V	TIZABBA-6900AA	N N N N N N N N N N N N N N N N N N N	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	VINNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	U34BBA-6900AA	U34BBA-6100AA
TKN6491B INTERCABLE KIT (SINGLE-FREQUENCY) X	TLE6592B TLE6593B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1553A TLE16603A TLE6603A TLE6603A TLE6605A TLE6575A TLE6575A TLE6574A TLE6575A TLE6575A TLE6575A TLE6575A TLE6575A TLE6575A TLE6583A TLE6585A TLE6585A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (494-512 MHz) POWER AMPLIFIER (494-512 MHz) POWER AMPLIFIER (494-512 MHz) INJECTION TRIPLER (470-494 MHz) INJECTION TRIPLER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (470-494 MHz)	MODEL	X Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z						X N N N N N N N N N N N N N N N N N N N	X N N N N N N N N N N N N N N N N N N N
INTERCABLE KIT (MULTI-FREQUENCY)	TLE6592B TLE6593B TLE6593B TLE6594B TLE6612B TLE6613B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1553A TLE1554A TLE6603A TLE6603A TLE6603A TLE6673A TLE6573A TLE6573A TLE6573A TLE6573A TLE6573A TLE6573A TLE6584A TLE6584A TLE6584A TLE6584A TLE6584A TLE6584A TLE6584A TLE6585A TFN1000AS TLN4473A TLN4476A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) INJECTION TRIPLER (470-494 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (494-512 MHz) VARACTOR MULTIPLIER (490-470 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (450-470 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (470-494 MHz)	MODEL	X X X X X X X X X X X X X X X X X X X	// // // // // // // // // // // // //					XXXX U34BBA-69	X X X X X X X X X X X X X X X X X X X
TLN5817A DIGITAL "PRIVATE-LINE" ENCODER-DECODER X X X X X X X X X X X X X X X X X X X	TLE6592B TLE6593B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1552A TLE1554A TLE6603A TLE6603A TLE6605A TLE6573A TLE6573A TLE6575A TLE6584A TLE6586A TLLE6586A TLLE6586A TLN4476A TLN4476A TLN4476A TLN4476A TLN4476A TLN4476A TLN4476A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (494-512 MHz) POWER AMPLIFIER (494-512 MHz) POWER AMPLIFIER (494-512 MHz) INJECTION TRIPLER (470-494 MHz) INJECTION TRIPLER (470-494 MHz) INJECTION TRIPLER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (494-512 MHz) VARACTOR MULTIPLIER (494-512 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (470-494 MHz) RECEIVER RF DECK (494-512 MHz) RECEIVER FILTER CIRCUIT PROTECTION KIT ANTENNA SWITCH KIT CHASSIS HARDWARE KIT INTERCABLE KIT (SINGLE-FREQUENCY)	MODEL	XXXXXX XXX XXX XXX XXX XXX XXX XXX XXX	//////////////////////////////////////					XXXX U34BBA-69	X X X X X X X X X X X X X X X X X X X
KXN1002A	TLE6592B TLE6593B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1553A TLE6603A TLE6603A TLE6603A TLE6603A TLE6603A TLE6573A TLE6575A TLE6575A TLE6575A TLE6575A TLE6584A TLN4473A TLN4476A TLN4836A TKN6491B TKN6491B TKN6492B TLN8427A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) HARMONIC FILTER (494-512 MHz) POWER AMPLIFIER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (494-512 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (494-512 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (470-494 MHZ) RECEIVER RF DECK (470-4	MODEL	X X X X X X X X X X X X X X X X X X X	//////////////////////////////////////					X X X X X X X X X X X X X X X X X X X	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
THN6113A FRONT PANEL & HOUSING KIT X X X X X X X X X X X X X X X X X X X	TLE6592B TLE6593B TLE6593B TLE6594B TLE6612B TLE6613B TLE6614B TFE6153A TFE6155A TLE1552A TLE1552A TLE1552A TLE1554A TLE6603A TLE6603A TLE6605A TLE6575A TLE6584A TLE6584A TLE6584A TLE6585A TN1000AS TLN4477A TLN4476A TLN4476A TLN4476A TLN487A TLN4476A TLN487A TLN4476A TLN487A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) HOWER AMPLIFIER (450-470 MHz) POWER AMPLIFIER (4450-470 MHz) POWER AMPLIFIER (449-512 MHz) INJECTION TRIPLER (450-470 MHz) INJECTION TRIPLER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (450-470 MHz) VARACTOR MULTIPLIER (450-470 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (470-494 MHz) RECEIVER FILTER CIRCUIT PROTECTION KIT ANTENNA SWITCH KIT CHASSIS HARDWARE KIT INTERCABLE KIT (MULTI-FREQUENCY) INTERCABLE KIT (MULTI-FREQUENCY) INTERCABLE KIT (MULTI-FREQUENCY) INTERCABLE KIT (MULTI-FREQUENCY) NEGATIVE GROUND PLUG KIT DIGITAL "PRIVATE-LINE" ENCODER-DECODER	MODEL	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	//////////////////////////////////////					XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX	U34BBA-61
TIMING TOOL	TLE6592B TLE6593B TLE6593B TLE6593B TLE6612B TLE6612B TLE6613B TLE6613B TLE6613B TFE6153A TFE6155A TLE1552A TLE1553A TLE1553A TLE1554A TLE6603A TLE6603A TLE6603A TLE6605A TLE6573A TLE6573A TLE6573A TLE6574A TLE6575A TLE6574A TLE6575A TLE6574A TLE6583A TLE6583A TLE6584A TLE6584A TLE6584A TLE6584A TLE6584A TLE6584A TLE6585A TFN1000AS TLN4473A TLN4476A TLN4836A TKN6491B TKN6492B TLN8427A TLN5817A TRN6005A KXN1002A	CIRCUIT BOARD (SINGLE-FREQUENCY) 450-470 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 470-494 MHz CIRCUIT BOARD (SINGLE-FREQUENCY) 494-512 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 450-470 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 470-494 MHz CIRCUIT BOARD (MULTI-FREQUENCY) 494-512 MHz HARMONIC FILTER (450-470 MHz) HARMONIC FILTER (470-494 MHz) HARMONIC FILTER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) POWER AMPLIFIER (470-494 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (494-512 MHz) INJECTION TRIPLER (494-512 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) VARACTOR MULTIPLIER (470-494 MHz) RECEIVER RF DECK (450-470 MHz) RECEIVER RF DECK (470-494 MHZ) RECEIVER RF DECK (470-470 MHZ) RECEIVER RF DECK (470-4	MODEL	X X X X X X X X X X X X X X X X X X X	//////////////////////////////////////					CXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	N34BBA-61

EPS-18015-A

TRANSMITTER RF POWER 3 3 3 3 3 3 3333 XXXX MOTOROLA 25 25 25 25 25 25 25 25 2 2 2 MODEL CHART RECEIVER FREQUENCIES FOR 450-512 MHz 15 W AND 25 W RF POWER "MOCOM .70" MOBILE FM TWO-WAY RADIO "DIGITAL PRIVATE-LINE" CODED SOUELCH PACKAGE RADIO SET MODELS (LATER VERSION) TRANSMITTER CODE: Х - ONE ITEM SUPPLIED REFER TO THE BASIC RADIO SET MODEL CHART FOR MODEL COMPLEMENT U24BBA-6900AA T24BBA-6100AA U24BBA-6300AA U24BBA-6900AA RADIO MODEL BASIC TYPE OF ITEM CONTROL HEAD (SINGLE-FREQUENCY) CONTROL HEAD (TWO-FREQUENCY) CONTROL HEAD (FOUR-FREQUENCY) TCN6141BE DASH-MOUN' TCN6141BF TCN6141BJ TCN6098CE CONTROL HEAD (TWO-FREQUENCY CONTROL HEAD (FOUR-FREQUENCY) CONTROL HEAD (TWO-FREQUENCY) TCN6136BF TKN6055A TKN6056A TRUNK-MOUNT TLN4445A MICROPHONE HANG-UP BOX SPEAKER INSTALLATION KIT DASH-MOUNT TLN6042A INSTALLATION KIT TRUNK-MOUNT ANTENNA (450-470 MHz) ANTENNA (470-512 MHz) ANTENNA, GAIN (450-470 MHz)

EPS-18016-A

	MOTOROLA			
	MOTOROLA	S	s	
	MODEL CHART	CIE	le le	
	FOR	IVE	1 1 2 2 1 1 1 1 1 MODE	1 1 2 4 7 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	450-512 MHz	RECEIVER FREQUENCIES		
		FI	LS	
	14 W AND 22/25 W RF POWER		SOU	
	"MOCOM • 70" BASIC RADIO SETS	W. 10	MOD	
		TRANSMITTER	CODED	
CODE:		MIT		
X = ONE IT	EM SUPPLIED	TRANSMITT	2 2 2 2 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4	1 2 2 4 1 2 2
		TR	RRIER INE" I	
= ONE IT	EM SUPPLIED DEPENDENT ON FREQUENCY RANGE			
- = ONE IT	EM SUPPLIED FOR FIVE OR LESS RADIO SETS	K		
2 = NUMBE	R INDICATES QUANTITY SUPPLIED	POWE	M M M M	MAM
			14 W 14 W 14 W 14 W 22/25 22/25 22/25 ''PRJ	14 W 14 W 14 W 14 W 22/25 22/25 22/25
= SEE UN	IFIED CHASSIS CHART FOR KIT COMPLEMENT.	도	14 14 14 14 22/ 22/ 22/ 22/ 22/	14 14 14 22 22 22/ 22/ 22/
				444444
		E E	24BBA-1000AA 24BBA-1100AA 24BBA-1300AA 24BBA-1900AA 34BBA-100AA 34BBA-1300AA 34BBA-1300AA	3000AA 3100AA 3300AA 3900AA 3100AA 3100AA
		MODEL	1100 1100 1100 1100 1100	
		MA	BA- BA- BA- BA- BA- BA- BA-	BA- BA- BA- BA- BA- BA-
ITEM	DESCRIPTION		U24BBA - 1000AA U24BBA - 1000AA U24BBA - 1900AA U24BBA - 1900AA U34BBA - 1100AA U34BBA - 1100AA U34BBA - 1300AA	U24BBA-3000AA U24BBA-3100AA U24BBA-3300AA U24BBA-3900AA U34BBA-3000AA U34BBA-3100AA
TUE1314AB	UNIFIED CHASSIS (470-494 MHz) 1-FREQ.			
TUE1315AB	UNIFIED CHASSIS (494-512 MHz) 1-FREQ.			
	LINITETED CHARGE (470 404 MILL) 4 EDEC			
*TUE1314AK	UNIFIED CHASSIS (470-494 MHz) 4-FREQ.			
*TUE1315AK	UNIFIED CHASSIS (494-512 MHz) 4-FREQ.			
*TUE1315AK *TUE1191BB	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ.			
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 4-FREQ. RESONATOR. TRANSMITTER		X 2 2 4 X 2 2 4	Y 2 2 4 Y 2 2
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 4-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER		X 2 2 4 X 2 2 4 X X 2 4 X X 2 4	X 2, 2, 4, X, 2, 2, X, X, 2, 4, X, X, 2, 2, 4, X, X, 2, 2, 4, X, X, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3,
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 4-FREQ. RESONATOR. TRANSMITTER RESONATOR. RECEIVER FRONT PANEL & HOUSING		X X Z 4 X X Z 4 X X X X X X X X X X X X	X X 2 4 X X 2 X X X X X X X
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A TLN4474A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 4-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER FRONT PANEL & HOUSING TUNING TOOL KIT		X 2 2 4 X 2 2 4 X X 2 4 X X 2 4 X X X X X X X X X 1 + + + + + + + +	X X 2 4 X X 2 X X X X X X X + + + + + + + + +
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 4-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER FRONT PANEL & HOUSING TUNING TOOL KIT MICROPHONE HANG-UP BOX		X X Z 4 X X Z 4 X X X X X X X X X X X X	X X 2 4 X X 2 X X X X X X X + + + + + + + + +
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A TLN4474A TLN4445A TLN4448A TLN4448A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER FRONT PANEL & HOUSING TUNING TOOL KIT MICROPHONE HANG-UP BOX "PRIVATE-LINE" ENCODER-DECODER BOARD KIT "VIBRASENDER" RESONANT REED		X X Z 4 X X Z 4 X X X X X X X X X X X X	X X 2 4 X X 2 X X X X X X X +++++++++ X X X X X X X X X
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A TLN4474A TLN4474A TLN4445A TLN4448A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 4-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER FRONT PANEL & HOUSING TUNING TOOL KIT MICROPHONE HANG-UP BOX		X X Z 4 X X Z 4 X X X X X X X X X X X X	X X 2 4 X X 2 X X X X X X X + + + + + + + + + + + + + + + + + + +
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A TLN4474A TLN4445A TLN4448A TLN4448A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER FRONT PANEL & HOUSING TUNING TOOL KIT MICROPHONE HANG-UP BOX "PRIVATE-LINE" ENCODER-DECODER BOARD KIT "VIBRASENDER" RESONANT REED		X X Z 4 X X Z 4 X X X X X X X X X X X X	X X 2 4 X X 2 X X X X X X X X +++++++++ X X X X X X X X X X X X X X X X X X X
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A TLN4474A TLN4445A TLN4448A TLN4448A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER FRONT PANEL & HOUSING TUNING TOOL KIT MICROPHONE HANG-UP BOX "PRIVATE-LINE" ENCODER-DECODER BOARD KIT "VIBRASENDER" RESONANT REED		X X Z 4 X X Z 4 X X X X X X X X X X X X	X X 2 4 X X 2 X X X X X X X +++++++++ X X X X X X X X X
*TUE1315AK *TUE1191BB *TUE1221BK KXN1002A K1018A THN6113A TLN4474A TLN4445A TLN4448A TLN4448A	UNIFIED CHASSIS (494-512 MHz) 4-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. UNIFIED CHASSIS (450-470 MHz) 1-FREQ. RESONATOR. TRANSMITTER RESONATOR, RECEIVER FRONT PANEL & HOUSING TUNING TOOL KIT MICROPHONE HANG-UP BOX "PRIVATE-LINE" ENCODER-DECODER BOARD KIT "VIBRASENDER" RESONANT REED		X X Z 4 X X Z 4 X X X X X X X X X X X X	X X 2 4 X X 2 X X X X X X X +++++++++ X X X X X X X X X

EPS-17016-0

UNIFIED CHASSIS KIT COMPLEMENT

			(A)	№ / ▼			
UNIFIED CHAS	SIS KIT COMPLEMENT		1.20-4.91BB	450 HZ2 18K	4 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	494.13.154B.	
KIT	DESCRIPTION	14 4	3 /5	2/2	A / F	~ &/Y	E 1 2 4
TFE6153A	Harmonic Filter	Ιx	T _X		1		
TFE6154A	Harmonic Filter	1	11	x		X	
TFE6155A	Harmonic Filter (494-512 MHz)			23	X		$ _{X}$
TFN1000AS	Receiver Filter	X	X	x	X	x	X
TKN6491B	Interconnect Cable (1-Freq.)	X		X	X	123	
TKN6492B	Interconnect Cable (4-Freq.)		X	123	123	X	X
TLE1552A	Power Amplifier (450-470 MHz)	X	X			125	21
	Includes:						
TLE8142A	Power Amplifier Board						
TLN4837A	Heatsink & Hardware Kit			i			
TLE1553A	Power Amplifier (470-494 MHz)			X		X	
	Includes:						
TLE8143A	Power Amplifier Board						
TLN4837A	Heatsink & Hardware Kit						
TLE1554A	Power Amplifier (494-512 MHz)				X		X
	Includes:						
TLE8144A	Power Amplifier Board					}	
TLN4837A	Heatsink & Hardware Kit						
TLE6573A	Varactor Multiplier (450-470 MHz)	X	X				
TLE6574A	Varactor Multiplier (470-494 MHz)			X		X	
TLE6575A	Varactor Multiplier (494-512 MHz)				X		X
TLE6583A TLE6584A	RF Deck Kit (450-470 MHz)	X	X				
TLE6585A	RF Deck Kit (470-494 MHz)			X		X	
TLE6603A	RF Deck Kit (494-512 MHz)				X		X
TLE6604A	Injection Tripler Kit (450-470 MHz)	X	X				
TLE6605A	Injection Tripler Kit (470-494 MHz)		1	X		X	
TLN4473A	Injection Tripler Kit (494-512 MHz) Antenna Switch Kit				X		X
TLN4476A	Antenna Switch Kit	X	X	X	X	X	X
TLN4836A	Chassis & Hardware Kit	X	Χ.	X	X	X	X
TLN8427A	Negative Ground Plug Kit	X	X	X	X	X	X
TLE6612B	Multi-Frequency Board (450-470 MHz)	X	X	X	X	X	X
TLE6613B	Multi-Frequency Board (470-494 MHz)		X			1	
TLE6614B	Multi-Frequency Board (470-494 MHz) Multi-Frequency Board (494-512 MHz)					X	
TLE6592B	1-Frequency Board (450-470 MHz)	V					X
TLE6593B	1-Frequency Board (450-470 MHz)	X		N.			
TLE6594B	1-Frequency Board (494-512 MHz)			X	37		
	1 1 requestey Doard (474-512 MHz)				X		

EPS-17019-0

	MOTOROLA	ם היה הכי הים) 	14 W		14 W		125	22/25 W	125		_		14 W	14 W	22/25 W		/25
	MODEL CHART FOR 450-512 MHz										S							
	"MOCOM • 70 ' RADIO SETS TRUNK-MOUNT PACKAGE MODELS	DFSCR IDTION	VELCH MODELS		1-FREQ, RECEIVE			1-FREO, RECEIVE			-CODED SQUELCH MODEI		1-FREQ. RECEIVE			1-FREO RECEIVE	A TOTAL MEGET	
	EM SUPPLIED SIC RADIO SET CHART FOR RADIO SET COMPLEMENT.	, C	CARRIFR SO	1-FREQUENCY	FREQ. >	4 EPEQUENCY	1-FRECUENCY	REO. X	15	4-FREQUENCY	LINE"	FREQU	FREO.	A FP FOUFNCY	1-FREQUENCY	2-FREO XMIT		4-FREQUENCY
			1			-	٠	+			>		-	+		t	A	A
		BASIC RADIO SET(*)		U24BBA-1000AA	U24BBA-1100AA	U24BBA-1300AA	1134BBA-1000AA	U34BBA-1100AA	U34BBA-1300AA	U34BBA-1900AA	"PRI		U24BBA-3100AA	TI24BBA-3900AA	U34BBA-3000AA	U34BBA-3100AA	U34BBA-3300AA	U34BBA-3900A
ITEM	DESCRIPTION	MODEL BASIC NUMBER RADIO SPT(#)		124BBA-1000AK U24BBA-1000AA	24BBA-1100AK	124BBA-1300AK U24BBA-1300AA T24BBA 1900AA	-1000AK	BA-1100AK	34BBA-1300AK	T34BBA-1900AK U34BBA-1900AA		-3000AK U24BBA-	T24BBA-3100AK U24BBA-3100AA					
ITFM ICN6098CF ICN6136BF ICN6098CF ICN6098CJ IKN6055A IKN6055A IAF6052A	DESCRIPTION CONTROL HEAD (1-FREQ.) DUAL-PURPOSE W/DIMMER CONTROL HEAD (C2-R1) DUAL-PURPOSE W/DIMMER CONTROL HEAD (2-FREQ.) DUAL-PURPOSE W/DIMMER CONTROL HEAD (4-FREQ.) DUAL-PURPOSE W/DIMMER CABLE KIT (17-FT) SINGLE-FREQ. CABLE KIT (17-FT) MULTI-FREQ. ANTENNA (450-470 MHz)	BASIC		X X 124BBA-1000AK	X T24BBA-1100AK	24BBA-1300AK	X T34BBA-1000AK	X T34BBA-1100AK	X T34BBA-1300AK	X T34BBA-1900AK		X X T24BBA-3000AK U24BBA-	X T24BBA-3100AK U24BBA-	X T24RBA-3900AK	X X T34BBA-3900AK	X T34BBA-3100AK	X T34BBA-3300AK	X T34BBA-3900AK

EPS-17017-0

	MOTOROLA	RF POWER		14 W	- 1		/25	22/25 W	14 W			125
	MODEL CHART		П				П			П		
	FOR		П				П					
	450-512 MHz						П	ET.S				
	"MOCOM · 70" RADIO SETS DASH-MOUNT PACKAGE MODELS	1	ı				П	MODET		П		
	EM SUPPLIED SIC RADIO SET CHART FOR RADIO SET COMPLEMENT.	BASIC RADIO SFT()	CARRIER SQUELCH MOD	U24BBA-1000AA 1-FREQUENCY	- 1900AA 4-FREOIIF	34BBA-1000AA	34BBA-1300AA	U34BBA-1900AA 4-FREQUENCY "PRIVATE-LINE" TONE-CODED SOUELCH	0000AA 1-FREQUENCY		000AA	
ITEM	DESCRIPTION	MODEL		D24BBA-1000AK	17	D34BBA-1000AK	D34BBA-1300AK	D34BBA-1900AK	11	D24BBA-3300AK	D34BBA-3000AK	D34BBA-3300AK
TCN6141BE	CONTROL HEAD (I-FREO.) DUAL-PURPOSE W/DIMMER			X C		X	9	9	D X		Q X	D
TCN6141BF TCN6141BJ	CONTROL HEAD (2-FREQ.) DUAL-PURPOSE W/DIMMER CONTROL HEAD (4-FREQ.) DUAL-PURPOSE W/DIMMER		H	X	>		X ,	X		X X		X
TAE6052A TAE6054A	ANTENNA (450-470 MHz) ANTENNA (470-512 MHz)			XV	v		ΧŽ	X	x ;		X	X
	INSTALLATION KIT			XX	X	X	X X	X			X	X:
TLN4208A TMN6013A	MICROPHONE			XX	125		X>		X)	7		X

C44BBN-3190A C44BBN-3190A C44BBN-1110A C44BBN-1110A	C44BBN-1130A C44BBN-1130A C44BBN-1190A	MODEL NUMBER	
WIDE-SPACED TRANSMITTER CHANNELS CARRIER SQUELCH PRIVATE-LINE" TONE-CODED SQUELCH 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	PRIVATE-LINE" TONE-CODED SQUELCH	QUENCIES RECEIVER F	MODEL CHART FOR 450-470 MHz "MOCOM·70" BASIC RADIO SETS . CODE: X = ONE ITEM SUPPLIED = ONE ITEM SUPPLIED FOR FIVE OR LESS RADIO SETS 2 = NUMBER INDICATES QUANTITY SUPPLIED
		REQUENCIES	
		ITEM	DESCRIPTION
X X XX		ITEM TLE1552A	POWER AMPLIFIER (FORMERLY TLE1302A)
X X XX X	XXX X	ITEM	
	XXX XXX	ITEM TLE1552A TLE6592A TLE6612A TLE6573A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER
X	XXX XXX XXX	ITEM TLE1552A TLE6592A TLE6612A TLE6573A TFE6153A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER
		ITEM TLE1552A TLE6592A TLE6612A TLE6573A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER
X X X X X X X X X X X X X X X X X X X		TLE1552A TLE6592A TLE6612A . TLE6573A TFE6153A TFN1000AS TLE6583A TLE6603A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER
X X X XX X X X X X		ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFF6153A TFN1000AS TLE6583A TLE6603A TLN4473A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD
X X X XX X	X X X X X X X X X X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6573A TFE153A TFN1000AS TLE6583A TLE6503A TLN4473A TLN4473A TKN6491A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY
X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	TLE1552A TLE6592A TLE6512A TLE6573A TFE6153A TFN1000AS TLE6583A TLE6603A TLN4473A TLN4475A TKN6491A TKN6492A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY
X X X XX X X X X X X X X X X X X X X X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6573A TFE6153A TFN1000AS TLE6583A TLE6583A TLN4473A TLN4475A TKN6491A TKN6491A TKN642A TLN6824A TLN8381A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASENDER" RESONANT REED "VIBRASPONDER" RESONANT REED
X X X XX X X X XX X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFE6153A TFN1000AS TLE6583A TLE6503A TLN4473A TLN4475A TKN6491A TKN6492A TLN64824A TLN8381A TLN8381A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASENDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD
X X X XX X X X XX X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFE6153A TFN1000AS TLE6583A TLE6603A TLN4473A TLN4475A TKN6491A TKN6492A TLN6824A TLN8381A TLN4448A THN6113A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASENDER" RESONANT REED "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT
X X X XX X X X X X X X X X X X X X X X		ITEM TLE1552A TLE6592A TLE6573A TFE6153A TFN1000AS TLE6583A TLN4473A TLN4475A TKN6491A TKN6492A TLN8381A TLN448A THN6113A TLN4474A TLN14474A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASENDER" RESONANT REED "VIBRASENDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT
X X X XX X		ITEM TLE1552A TLE6592A TLE6592A TLE6512A TLE6573A TFE153A TFN1000AS TLE6583A TLN4473A TLN4473A TLN4475A TKN6491A TKN6491A TKN6492A TLN8381A TLN8381A TLN4474A TLN1474A TLN1474A TLN1477A TLN1477A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASENDER" RESONANT REED "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT ANTENNA SWITCH
X X X XX X X X X X X X X X X X X X X X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6573A TFE6153A TFN1000AS TLE6583A TLN4473A TLN4475A TKN6491A TKN6492A TLN8381A TLN448A THN6113A TLN4474A TLN14474A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLIER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASENDER" RESONANT REED "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT
X X X XX X X X X X X X X X X X X X X X X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFE6153A TFN1000AS TLE6583A TLE6603A TLN4473A TLN4475A TKN6491A TKN6492A TLN8381A TLN84881A TLN4448A THN6113A TLN4474A TLN1477A TLN1477A TLN1477A TLN1477A TLN1477A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT ANTENNA SWITCH CHANNEL RESONATOR, TRANSMITTER (FORMERLY K1017A)
X X X XX X X X X X X X X X X X X X X X X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFE6153A TFN1000AS TLE6583A TLE6603A TLN4473A TLN4475A TKN6491A TKN6492A TLN8381A TLN84881A TLN4448A THN6113A TLN4474A TLN1477A TLN1477A TLN1477A TLN1477A TLN1477A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT ANTENNA SWITCH CHANNEL RESONATOR, TRANSMITTER (FORMERLY K1017A)
X X X XX X X X X X X X X X X X X X X X X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFE6153A TFN1000AS TLE6583A TLE6603A TLN4473A TLN4475A TKN6491A TKN6492A TLN8381A TLN84881A TLN4448A THN6113A TLN4474A TLN1477A TLN1477A TLN1477A TLN1477A TLN1477A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT ANTENNA SWITCH CHANNEL RESONATOR, TRANSMITTER (FORMERLY K1017A)
X X X XX X X X X X X X X X X X X X X X X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFE6153A TFN1000AS TLE6583A TLE6603A TLN4473A TLN4475A TKN6491A TKN6492A TLN8381A TLN84881A TLN4448A THN6113A TLN4474A TLN1477A TLN1477A TLN1477A TLN1477A TLN1477A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASPONDER" RESONANT REED "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT ANTENNA SWITCH CHANNEL RESONATOR, TRANSMITTER (FORMERLY K1017A)
X X X XX X X X X X X X X X X X X X X X X	X X X X X X X X X X	ITEM TLE1552A TLE6592A TLE6512A TLE6513A TFE6153A TFN1000AS TLE6583A TLE6603A TLN4473A TLN4475A TKN6491A TKN6492A TLN8381A TLN84881A TLN4448A THN6113A TLN4474A TLN1477A TLN1477A TLN1477A TLN1477A TLN1477A	POWER AMPLIFIER (FORMERLY TLE1302A) SINGLE-FREQ. CIRCUIT BOARD TWO & FOUR-FREQ. CIRCUIT BOARD VARACTOR MULTIPLER HARMONIC FILTER RECEIVER FILTER (FORMERLY TFN6027AS) RF DECK INJECTION TRIPLER POWER-TEMPERATURE MONITOR CIRCUIT BOARD CHASSIS AND HARDWARE KIT INTERCABLING KIT, SINGLE-FREQUENCY INTERCABLING KIT, MULTI-FREQUENCY "VIBRASPONDER" RESONANT REED "VIBRASPONDER" RESONANT REED "PRIVATE-LINE" ENCODER-DECODER CIRCUIT BOARD HOUSING KIT TUNING TOOL KIT NECATIVE GROUND KIT ANTENNA SWITCH CHANNEL RESONATOR, TRANSMITTER (FORMERLY K1017A)

EPS-7478-A

TRANSMITTER	MODEL CHART FOR 470-512 MHz "MOCOM-70" BASIC RADIO SET "MOCOM-70" BASIC RADIO SET "MOCOM-70" BASIC RADIO SET "MOCOM-70" BASIC RADIO SET TONE ITEM SUPPLIED ONE ITEM SUPPLIED FOR FIVE OR LESS RADIO SETS I ONE ITEM SUPPLIED FOR FIVE OR LESS RADIO SETS I ONE ITEM SUPPLIED FOR FIVE OR LESS RADIO SETS I NUMBER INDICATES QUANTITY SUPPLIED DESCRIPTION POWER AMPLIFIER 1470-494 MHz) FORMERLY TLEIN03A SINILE - FREQUENCY CIRCUIT BOARD 1470-494 MHz) SINILE - FREQUENCY CIRCUIT BOARD 1470-194 MHz) INDICATOR MULTIPLIER 1470-494 MHz VARACTOR MULTIPLIER 1470-494 MHz VARACTOR MULTIPLIER 1470-494 MHz HARMONG FILTER 1470-494 MHz RED DECK 1470-194 MHz RED DECK 1470-194 MHz INJECTION TRIPLER 1470-494 MHz INJECTION TRIPLER 1470-494 MHz INJECTION TRIPLER 1470-494 MHz NINJECTION TRIPLER 1470-194 MHZ RED DECK 1470-194 MHZ RED
-------------	--

EPS-8064-A

C	MODEL CHART FOR 450-470 MHz "MOCOM · 70" RADIO SETS WITH ACCESSORIES VERSION 2	DESCRIPTION	DASH MOUNT RADIO SET CARRIER SOIIETCH	1-FREGUENCY 2-FREGUENCY	MULTI-EREQUENCY		MULTI-FREQUENCY TRUNK MOUNT RADIO SET	DUENCY		VATE-LINE" TONE-CODED SQUELCH I-FREQUENCY	2-FREQUENCY MILTI-FREQUENCY	MOLITY RESCHALL		EQUE	ALFREQUENCY MULTI-PREQUENCY SPACED TRANSMITTER CHANNELS	TER SQUELCH	110A I -FREQUENCY RECEIVER, 2-FREQUENCY TRANSMITTER "PRIVATE-LINE" TONE-CODED SOUEICH
9	X = ONE ITEM SUPPLIED = ONE ITEM SUPPLIED DEPENDENT ON FREQUENCY RANGE. EE BASIC RADIO SET MODEL CHART FOR RADIO SET COMPLEMENT	BASIC RADIO SET		U44BBN-1130A U44BBN-1130A	U44BBN-1190A	-31	U44BBN-3190A	110	U44BBN-1130A U44BBN-1190A	"PRI" U44BBN-3100A	U44BBN-3130A U44BBN-3190A	U44BBN-1100A			U44BBN-3130A U44BBN-3190A WTDE-		U44BBN-1110A "PRIV
ITEM	DESCRIPTION	PACKAGE MODEL		D44BBN-1100BK D44BBN-1130BK	44BBN-1190BK	D44BBN-3130BK D44BBN-3130BK	44BBN-3190BK	44BBN-1100BK	T44BBN-1130BK T44BBN-1190BK	44BBN-3100BK	44BBN-3130BK 44BBN-3190BK	T44BBN-1100CK	T44BBN-130CK	T44BBN-3100CK	T44BBN-3130CK T44BBN-3190CK	Vidoliti valett	144BBN-1110BK
TLN6246A TCN6141BE TLN4208A TMN6013A TSN6000A TCN6141BF	"PRIVATE-LINE" HANG-UP BOX DUAL-PURPOSE CONTROL HEAD, 1-FREQ. WITH DIMMER (DASH MOUN INSTALLATION KIT, DASH MOUNT MICROPHONE SPEAKER DUAL-PURPOSE CONTROL HEAD, 2-FREQ. WITH DIMMER (DASH MOUN			X X X X X	X	X X X X X X X X X X X X X X X X X X X	X X	X	X X X X	X	XX		XX		X X	×	
ICN6141BJ ICN6026BE IKN6055A ILN6042A ICN6026BF IKN6056A	DUAL-PURPOSE CONTROL HEAD, 4-FREQ. WITH DIMMER (DASH MOUN DUAL-PURPOSE CONTROL HEAD, 1-FREQ. (TRUNK MOUNT) CABLE KIT. TRUNK MOUNT, SINGLE FREQ. INSTALLATION KIT, TRUNK MOUNT DUAL-PURPOSE CONTROL HEAD, 2-FREQ. (TRUNK MOUNT) CABLE KIT, TRUNK MOUNT, MULTI-FREQ.	T)			X		X	X X X	X XX		X X X		X	XXXX	x x	×	<
CN6026BJ CN6136BF LN4445A AE6052A AE6062A	DUAL-PURPOSE CONTROL HE AD, 4-FREQ. (TRUNK MOUNT) DUAL-PURPOSE CONTROL HEAD, C2-R1, WITH DIMMER (TRUNK MOUN "PRIVATE-LINE" HANG-UP SWITCH BOX ANTENNA (450-470 MHz) ANTENNA (450-470 MHz)	Т)		72	7		4		X 		X X		14	x z		X	

xvi

MODEL CHART FOR 450-470 MHz "MOCOM · 70" RADIO SETS WITH ACCESSORIES VERSION 1 CODE: X = ONE ITEM SUPPLIED	DESCRIPTION	DASH MOUNT RADIO SET CARRIER SQUELCH		Z-r reguenc i Multi-frequency	IVATE-LINE: TONE-CODED SQUELCH	2-FREQUENCY MULTI-FREQUENCY	TRUNK MOUNT RADIO SET	EOUE	Z-FREDENCY Z-FREDENCY WATE, INE" TONE-CORD SOIFTCH	1- FREQUENCY	Z-FREQUENCY MULTI-PREQUENCY SPACED TRANSMITTER CHANNELS	CARRIER SQUELCH I-FREQUENCY RECEIVER, 2-FRE	INATE-LINE" TONS-CODED SQUEICH T-FREGUENCY RECEIVER, 2-FREQUENCY TRANSMITTER	
SEE BASIC RADIO SET MODEL CHART FOR RADIO SET COMPLEMENT	BASIC RADIO SET		U44BBN-1100A	N-1150A	-3100A			U44BBN-1100A	U44BBN-1150A U44BBN-1190A	BN-3100A	U44BBN-5150A U44BBN-3190A WIDE	U44BBN-1110A	U44BBN-3110A	
ITEM DESCRIPTION	PACKAGE		D44BBN-1100AK	D44BBN-1190AK	3N-3	D44BBN-3130AK D44BBN-3190AK	Ш	100AK	T44BBN-1130AK T44BBN-1190AK	m	T44BBN-3130AK T44BBN-3190AK	T44BBN-1110AK	T44BBN-3110AK	
FLN6246A "PRIVATE-LINE" HANG-UP BOX [CN6141AE CONTROL HEAD, CARRIER SQUELCH, 1-FREQ, WITH DIMMER INSTALLATION KIT, DASH MOUNT ENN60013A MICROPHONE SPEAKER CAE6052A ANTENNA CON6141AF CONTROL HEAD, CARRIER SQUELCH, 2-FREQ, WITH DIMMER (CN6141AJ CONTROL HEAD, "PRIVATE - LINE" TONE-CODED SQUELCH, 1-FREQ. WITH DIMMER CONTROL HEAD, "PRIVATE - LINE" TONE-CODED SQUELCH, 1-FREQ. WITH DIMMER			X X X X		X X X X	X X X X X X			K X X X X	×	X X X X X X X X X X X X X X X X X X X	×	X X X	
CN6141AH CONTROL HEAD, "PRIVATE-LINE" TONE-CODED SQUELCH, 2-FREQ. WITH DIMMER CN6141AK CONTROL HEAD, "PRIVATE-LINE" TONE-CODED SQUELCH, 4-FREQ. WITH DIMMER CN6026AE CONTROL HEAD, CARRIER SQUELCH, 1-FREQ. KN6055A CABLE KIT, TRUNK MOUNT, SINGLE FREQ. INSTALLATION KIT, TRUNK MOUNT CN6026AF CONTROL HEAD, CARRIER SQUELCH, 2-FREQ. CN6026AJ CONTROL HEAD, CARRIER SQUELCH, 4-FREQ. CN6026AJ CONTROL HEAD, "PRIVATE-LINE" TONE-CODED SQUELCH, 1-FREQ. CN6026AG CONTROL HEAD, "PRIVATE-LINE" TONE-CODED SQUELCH, 2-FREQ. CN6026AK CONTROL HEAD, "PRIVATE-LINE" TONE-CODED SQUELCH, 4-FREQ. CN6026AK CONTROL HEAD, "PRIVATE-LINE" TONE-CODED SQUELCH, 4-FREQ.						X		2		X	XXX			

EPS-4831-A

MODEL CHART FOR 470-12 Mile 4				
MODEL CHART FOR 470-518 MHR "MOCOM" 70" PADIO SETS WITH ACCESSORIES CODE: "SEE BASIC RADIO SET MODEL CHART FOR RADIO SET COMMILAMENT SEE BASIC RADIO SET SEE BAS	TCN	ITE		
MODEL CHART FOR #17-112 MR #17-12 MR	1614]] 16026) 16026) 16026) 16136 16136 16136 161036 16000 16000 16000 16000 16000 16000 16000 16000 16000 16000 16000 16000 16000 16000 16000 16000			
#*MOCOM: 70P ARJOSETS WITH ACCESSORIES WITH ACCESSORIES COOK: **SEE BASIC RADIO SET MODEL CHART FOR RADIO SET COMPLEMENT **COMPLEMENT **OCH ITEM SUPPLIED **OCH ITEM SUP		/	MOTORO	LA
#*MOCOM: 70P ARJOSETS WITH ACCESSORIES WITH ACCESSORIES COOK: **SEE BASIC RADIO SET MODEL CHART FOR RADIO SET COMPLEMENT **COMPLEMENT **OCH ITEM SUPPLIED **OCH ITEM SUP			MODEL CHART	
#MOCOM: 78° ARJOSETS WITH ACCESSORIES WITH ACCESSORIES WITH ACCESSORIES WITH ACCESSORIES WITH ACCESSORIES WITH ACCESSORIES **SEE BASIC RADIOSET MODEL CHART FOR RADIO SET COMPLEMENT **SEE BASIC RADIOSET MODEL CHART FOR RADIO SET COMPLEMENT **OFTIONAL ANTENNA. THE ANTENNA USED WITH THE REPRESENTATION OF THE PROPERTY OF TH	NTR NTR NTR NTR NTR BLE CRO OTEN NTR NTR NTR NTR NTR NTR NTR NTR		FOR	
CODE: ** SEE BASIC RADIO SET MODEL CHART FOR RADIO SET COMPLEMENT **COMPLEMENT **CO	OLTHOUSE BEAUTION OF THE COLTHOUSE BEAUTION		470-512 MHz	
CODE:	EAD EAD EAD SING	''MC	COM · 70" RADIO SETS	
### SEE BASIC RADIO SET MODEL CHART FOR RADIO SET COMPLICATION OF THE SET OF		IPTI	VITH ACCESSORIES	
COMPLEMENT SOLOWS ONE STEM SUPPLIED ONE STEM SUP	ALPALLPALLP ALPALLP FERBER BERER BER	CODE:	IC BADIO CET MODEL CU	ART DOD DADYO CRT
REP AS FOLLOWS:		* = SEE BAS COMPLE		ART FOR RADIO SET
REPLACE REPL	OSE, 1 OSE, 1 OSE, 1 OSE, 1 OSE, 1 OSE, 1 OSE, 1 OSE, 1 OSE, 2 OSE, 2 OSE, 2 OSE, 3 OSE, 3 OS	X = ONE ITE	M SUPPLIED	
ANTENNA RAPPOSET ERP TABEGSAA (Unity Gain) 16 W 10 W TABEGSAA		DADIOC	ET DETERMINES EFFECT	NNA USED WITH THE TIVE RADIATED POWER
Nobel Radio Set	HILLY (THE WILL) (THE			ERP
Nobel Radio Set	H DIM	TAE6054A (Un	ity Gain) 16 W	
DASH MOINT RADIOSET	MER MER MER MER MER MER	(3-1/2 dB Gair	16 W	25 W
Nobel Radio Set	(TRU)			50 W
Nobel Radio Set	SH MOI SH MOI JNK MOI NK MOU NK MOU			ANTENNAS ARE
CARRIER SQUELCH CARRIE	TIND (TIND) (TIND)			
			DASH MOUNT RADI CARRIER SQUELO	O.SET
		D24BCA-1300AK U24BCA-1300AA	16 W	
X		D34BCA-1000AK U34BCA-1000AA	22 W	1 1
			. 22 W	4 4
X			16 W	1 1
X		D34BCA-3000AK U34BCA-3000AA		1 1
X X X X X X X T24BCA-1000AK U24BCA-1000AA 16 W 2 2 2 2 2 2 2 2 2	XXXXX		22 W	4 4
	× ××××××××××××××××××××××××××××××××××××	T24BCA -1000AK 1124BCA 1000AA	CARRIER	
X		T24BCA-1300AK U24BCA-1300AA	16 W	2 2
X X X X X X X X X X		T34BCA-1300AK U34BCA-1300AA T34BCA-1300AK U34BCA-1300AA	22 W 22 W	1 1 2
X X X X X X X X X X	×× ×××	T24BCA-1000BK U24BCA-1000AA	16 W	
X		T24BCA-1900BK U24BCA-1900AA	16 W	
T24BCA-3000AK		T34BCA-1300BK U34BCA-1300AA	22 W	
T24BCA-3300AK		T24BCA-3000AK U24BCA-3000AA	"PRIVATE-LINE	
1		T24BCA-3900AK U24BCA-3900AA	16 W 16 W	
T24BCA-3000BK		T34BCA-3300AK U34BCA-3300AA	22 W	
T24BCA-3900BK		T24BCA-3000BK U24BCA-3000AA	16 W	1 1
X X X X X X X X X X		T24BCA-3900BK U24BCA-3900AA	16 W	
WIDE-SPACED TRANSMITTER CHANNELS CARRER SQUE LCH		T34BCA-3300BK U34BCA-3300AA	22 W	
T24BCA-1103AK U24BCA-1103AA 16 W 2 1 T34BCA-1103AK U34BCA-1103AA 22 W 2 1 T24BCA-3103AK U34BCA-3103AA 16 W 2 1 T24BCA-3103AK U34BCA-3103AA 16 W 2 1 T34BCA-3103AK U34BCA-3103AA 22 W 2 1 T34BCA-3103AK U34BCA-3103AA 22 W 2 1		W	DE-SPACED TRANSMITTE CARRIER SOUE LO	ER CHANNELS
T34BCA-3103AK U34BCA-3103AA 22 W 2 1		T34BCA-1103AK U34BCA-1103AA	22 W	2 1
	B 스프로프리 교정등장한 막막바쁘스 보시되었다 라마마마 B B	124BCA-3103AK UZ4BCA-3103AA	16 W	2 1
41 G-8009+C				EPS-8065-C

DESCRIPTION

1. INTRODUCTION

The Motorola "Mocom.70" radios are completely transistorized mobile FM two-way units which fully utilize the advantages of solid-state circuits -- reliability, small size, ruggedness and low maintenance requirements. Current demands are low, since tube filaments are eliminated and unheated crystals are used for frequency control.

These radio sets can utilize existing "Motrac" accessories. The units may be installed so that the control head ON-OFF switch turns on the transmitter and receiver or the receiver alone. In the latter case, power for the transmitter is routed through the vehicle ignition switch, so that transmission is impossible unless the ignition switch is turned on.

A variety of models are available which provide carrier squelch or "Private-Line" tone-coded squelch operation. The model chart at the front of this manual lists the available models.

2. TRANSMITTERS

Complete transistorization of the FM transmitter and the use of unheated crystals allow instantaneous on-frequency transmission over an ambient temperature range of -30°C to +60°C as soon as power is applied. Modulation is effected by a direct frequency modulator. The frequency of the modulated signal is multiplied and then applied to the amplifier output stages. The output frequency is 27 times the crystal frequency. A high level of spurious frequency attenuation is achieved in a four section harmonic filter in the transmitter output. The transmitter provides a minimum output of 25 watts in the 450-470 MHz range and an effective radiated power of 10 watts, 25 watts or 50 watts in the 470-512 MHz range.

3. RECEIVERS

The receivers used in these radio sets are crystal-controlled, dual conversion models which provide five watts of audio power. A highly selective rf preselector (tuned cavities), a high i-f crystal filter and a sealed, life-time guaranteed "Permakay" filter in the low i-f stages determine the excellent bandwidth and

selectivity characteristics of the receivers.
Plug-in resonators provide stable frequency control.

These models include a noise-actuated squelch circuit consisting of a noise limiter, a noise detector and a dc control stage (switching circuit) to cut off the audio amplifier. This eliminates disturbing noise which would otherwise be heard at the speaker during intervals between received messages.

4. "DIGITAL PRIVATE-LINE" (DPL) AND TONE "PRIVATE-LINE" (TPL) SQUELCH MODELS

This type of radio set is an improvement in FM two-way radio equipment especially when operating under crowded channel conditions. Several networks, using either DPL or TPL, can use the same rf carrier frequency in the same area if each network uses a different code (in DPL) or a different tone (in TPL).

The transmitters are modulated by a continuous sub-audible code signal (digital or tone) in addition to the voice modulation. The receivers accept only signals which are modulated with the correct tone or digital code and reject all others.

Both DPL and TPL squelch models also include noise-actuated squelch circuitry as previously described for carrier squelch models. This enables the operator to monitor the channel before transmissions and prevent interference with other users of the frequency.

In DPL or TPL squelch models, the decoding circuits are operative at all times. The monitor-operate switch and the hook-switch on the hangup switch box, when a dual-purpose control head is used, places the noise-actuated squelch circuit in or out of operation.

In "Private-Line" tone-coded squelch models, the SQUELCH control determines the composite dual-squelch sensitivity. In normal operation, the receiver audio is activated only when both of the following conditions occur:

a. An on-frequency rf signal must be received to disable the noise (carrier squelch) circuit.

b. The on-frequency rf signal must be FM modulated with the proper sub-audible tone frequency to activate the "Private-Line" decoder. In "Digital Private-Line" binary-coded squelch models, squelch is only controlled by the "Digital Private-Line" decoder output.

5. NETTING FEATURES

The netting feature provides a quick method of checking the frequency of either the transmitter or the receiver if both are aligned to the same frequency and if one is known to be "on-frequency". With the Motorola Portable Test Set, the test can be made in one simple operation.

Plug the test set into either meter socket and switch the test set meter to position #4. The meter will indicate the discriminator output. Remote one end of the wire netting jumper, located near L105 in the exciter from its normal pin and connect it to the pin located near CR180 in the exciter IDC circuit. This energizes the low level stages of the transmitter exciter and causes a signal to be radiated to the receiver. The receiver or transmitter oscillator can then be "warped" on-frequency by adjusting for zero discriminator output.

6. HOUSING

The basic radio set consists of a transmitter and receiver housed together to form a drawer unit which slides into the #16 gauge housing. All external connections are made through receptacles on the front panel.

The radio set housing can be mounted either under the vehicle dashboard or in the trunk. The same drawer assembly, including transmitter and receiver, slides into the housing in either type of installation. In mobile radio fleets, where both dash- and trunk-mount installations are used, this design provides full flexibility in exchanging radio sets between vehicles. Trunk-mounted radio sets are remotely controlled by means of a dash-mounted control head.

A removable handle is attached to the front panel. It can be removed by loosening the two screws located on the bottom ends of the handle. A key lock is also mounted on the front panel to secure the radio from unauthorized persons.

For servicing purposes, the major chassis is easily accessible by removing the drawer unit from the housing. Refer to the SERVICE AIDS section of this manual for instructions on the removal of individual components.

7. ACCESSORIES

In addition to the basic radio set, accessories are required to complete the installation. Various

combinations of accessories are available to meet specific requirements. The accessories are listed in the Model Chart in the front part of this manual.

The control heads available as one of the accessories provide all the required control facilities for operation of the radio set. The dash-mount control heads plug directly into the front panel when the handle is removed. Control heads for trunk-mounted units have an adjustable angle-bracket for mounting to the vehicle dash and are connected to the radio set via a cable kit.

The microphone used with the radio set is a palmtype microphone with a transistorized preamplifier. The microphone has a 12-inch tinsel coiled-cord and a four-pin connector for plugging into the receptacle on the control head.

A special mounting kit is included with the dash-mount accessories to mount the radio set in the passenger compartment of the vehicle.

8. OPTIONAL ACCESSORIES

The following options are available to meet specific customer requirements:

- TLN1097A Time-Out Timer This option prevents extended transmitter keying.
- TLN8482A Ground Reversing Kit This kit is required for positive ground operation.
- Dimmer Control Head This option is available for all trunk-mounted radio set control heads. (Dash-mount dimmer control heads are standard equipment.)
- TLE6532A Receiver Preamplifier This option improves receiver sensitivity by 6 dB, thereby extending the range of communications.

Additional options are available that allow the customer to delete antennas, speakers, microphones or "Private-Line" hang-up brackets from the package model equipment complements.

Many other accessories are available; some are given here. Contact your local Motorola Radio Communications Representative for complete details or for information on other accessories.

- Mobile Coaxial Antenna where rooftop antenna is not practical or desirable.
- 5 dB Gain Antenna for improved system performance.
- Dynamic Handset where telephone type handset is either preferred or where speaker muting is desired for privacy.

INSTALLATION AND OPERATION

INSTALLING THE RADIO SET

Complete installation instructions are packed in the shipping carton with the radio set. Install the radio set according to the instructions supplied.

IMPORTANT

DO NOT CUT ANTENNA CABLE unless absolutely necessary. If cable must be shortened, reduce power output of transmitter as indicated in the table to maintain FCC approved Effective Radiated Power (ERP). Standard cable length is 14 feet.

Antenna	Radio		LENGT	H OF C	ABLE	(FEET)		1
Model	Model Series	4	6	8	10	12	14	ERP
TAE6054A TAE6074A or TAE6075A TAE6064A or TAE6065A	T/D/U24BBA/BCA T/D/U24BBA/BCA T/D/U34BBA/BCA	10W 10W	11W 11W	12W 12W	13W 13W	14W 14W 20W	15W 15W	10W 25W

1. OPERATING INSTRUCTIONS

CAUTION

This radio set, when supplied with a Model TLN8427A Negative Ground Kit, must be used in negative groundinstallations only. For positive ground installations, a Model TLN8482A Ground Reversing Kit is available. This kit must be inserted in the socket with the POS GND mark opposite the arrow on the polarity plug plate when used in positive ground installations. This ground reversing kit may be used in negative ground installations also. In such cases, the kit must be inserted in the socket with the NEG GND mark opposite the arrow on the polarity plug plate.

NOTE

Depending on the type of control head being used, the procedure for placing the radio in or out of "Private-Line" operation (hereafter referred to as PL mode) may vary. Refer to the following:

--Dual-Purpose Control Heads - these control heads do not contain a "PL" ON-OFF switch. To place the radio in the PL mode, set the monitor-operate switch on the hang-up switch box to the operate (opposite))) position. To take the radio out of the PL mode, place the monitor-operate switch in the monitor ())) position.

--All other control heads - these control heads contain a "PL" ON-OFF switch. By placing the switch in the appropriate position, the PL mode will be either on or off.

TO RECEIVE

MULTI-FREQ. MODELS ONLY	Place the frequency selector switch in the desired position.
ALL MODELS	Place the ON-OFF switch in the ON position or turn the OFF-VOLUME control clockwise. The green lamp will go on to indicate the "standby" condition. The receiver is in full operation.

TO HEAR ALL ON-FREQUENCY SIGNALS

"PRIVATE-LINE" MODELS ONLY	Take the radio out of the PL mode.
ALL MODELS	Turn the SQUELCH control
TILL WODELD	
	to the full counterclockwise
	position. Turn the VOL-
	UME control clockwise
	until noise is heard. Adjust
	the SQUELCH control by
	turning it slowly clockwise
	until the noise is just
	squelched (cuts out). Set the
	VOLUME control to the
	desired listening level with
	a received signal.

TO HEAR "PRIVATE-LINE" SIGNALS ONLY

"PRIVATE-LINE"	Take the radio out of the
MODELS ONLY	PL mode.
	Turn the SQUELCH control
	to the full counterclockwise
	position. Turn the VOLUME
	control clockwise until noise
	is heard. Adjust the
	SQUELCH control by turn-
	ing it slowly clockwise until
	the noise is just squelched
	(cuts out). Place the
	radio in the PL
	mode. Set the VOLUME
	control to the desired
	listening level with a
	received signal.

ALL MODELS

Proceed as previously described under "TO RE-CEIVE" and "TO HEAR ALL ON-FREQUENCY SIGNALS" Turn "on" the wehicle ignition switch. For short transmissions it is not necessary to start the engine; however, to conserve the battery, the engine should be running. When the channel is clear, hold the microphone about one inch from the lips and turned about 30° away from the face. Press the push-to-talk button. The red lamp will come on and the transmitter will go "on the air". Speak slowly and clearly across the microphone in a normal or slightly louder than normal voice. At the end of the message, release the push-to-talk button and replace the microphone in the hang-up bracket.

CAUTION

To prevent accidental transmission or jamming of the channel by inadvertent keying of the transmitter, do not leave the microphone lying on the seat where the button may be accidentally operated.

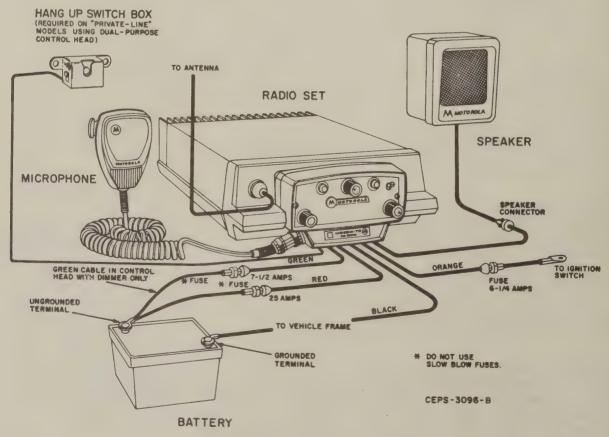
ALL MODELS	Place the ON-OFF switch in the OFF position or turn the OFF-VOLUME
	control counterclockwise until a click is heard.

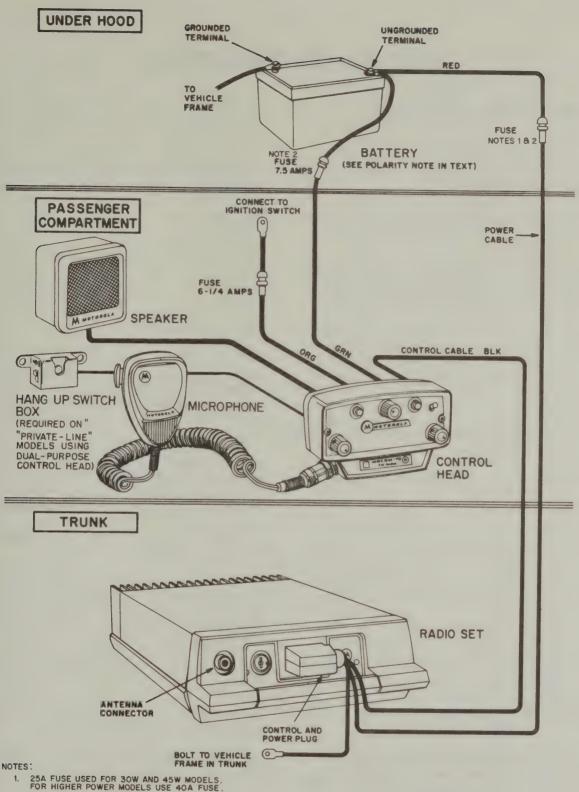
2. LOW CURRENT DRAIN MODIFICATION

(Non-Dimmer Control Heads Only)

If desired, an additional saving in battery current drain of about 200 mA (in the standby condition) may be obtained by a wiring modification in the control head. If this modification is incorporated, the green pilot lamp will not operate unless the ignition switch is in the ON position. Proceed as follows to complete the modification.

- a. Loosen the two mounting screws and remove the control head.
- b. Remove the end of the 33-ohm resistor attached to the green lamp from the terminal of the OFF-VOLUME control or the ON-OFF switch.
- c. Connect the end of the resistor which was removed in step b. to the terminal of the OFF-VOLUME control or the ON-OFF switch to which the red lamp is connected.





2. DO NOT USE SLOW BLOW FUSE.

CEPS-3097-D

Typical Trunk-Mount Installation

THEORY OF OPERATION

1. FUNCTIONAL OPERATION

The overall operation of the radio set is illustrated in the Functional Block Diagram in Figure 1. This diagram applies to both dash and trunk-mount installations.

The dc input to the radio is applied through three separate leads in the following manner:

- -- The primary power (12 volts from the ungrounded side of the battery) is applied to the transmitter via the polarity reversing socket and the relay.
- -- Power for the receiver and low level transmitter stages comes from the ungrounded terminal of the battery and passes through the OFF-ON switch (in the control head) and the polarity reversing socket.
- -- The transmitter keying voltage is connected to both the vehicle ignition switch and the OFF-ON switch in the control head. This gives vehicle ignition control to transmitter operation since the push-to-talk function will be inoperative with the ignition switch turned off.

The function of the polarity reversing socket is to provide voltages of the proper polarity to the radio circuitry in either positive or negative ground installations. With the exception of the audio push-pull output stages, the receiver and some circuits within the transmitter require a voltage which is always positive with respect to chassis. In positive ground systems, this voltage is supplied by the TLN8482A Ground Reversing Kit. In negative ground systems, connections through the polarity reversing socket are supplied by the TLN8427A Negative Ground Kit or by the TLN8482A Ground Reversing Kit (see the INSTALLATION AND OPERATION section of this manual).

When the control head ON-OFF switch is turned on, the receiver is immediately operative and the green lamp on the control head lights, indicating the radio set is ON.

In negative ground operation, battery voltage (A+) is applied to:

- -- The entire receiver.
- -- The transmitter audio amplifier.

-- The PL encoder, decoder, and time delay circuits (in "Private-Line" radio sets only).

A regulated 9.1-volt supply (chassis referenced) is derived from the receiver A+ voltage. This regulated voltage is applied to:

- -- Both the transmitter and receiver oscillators.
 - -- The transmitter IDC circuit.
- -- The PL tone generator (in "Private-Line" radio sets only).
 - -- The time-out timer

In positive ground operation, the chassis referenced A+ is supplied by the converter in the TLN8482A Ground Reversing Kit. Other connections in this kit provide for maintaining the required A+ to A- polarity for the remaining circuits.

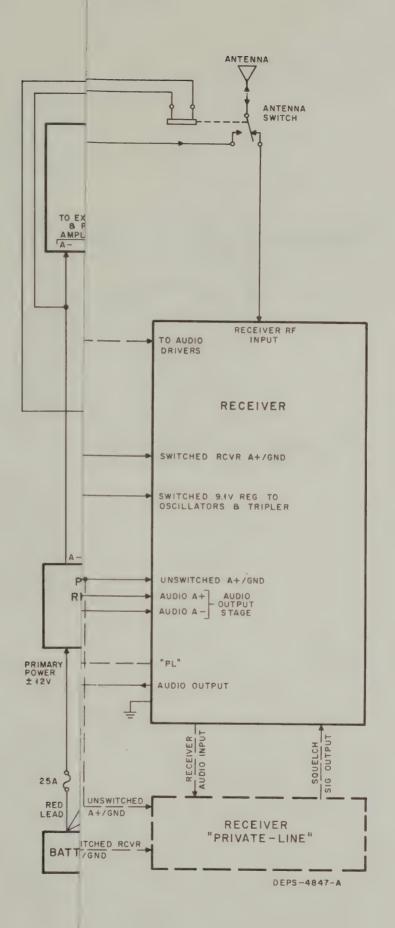
When the power ON-OFF switch and the vehicle ignition switch are both turned on, the transmitter is immediately ready for operation. When the push-to-talk button on the microphone is pressed, the following functions are performed:

- -- The red lamp in the control head lights indicating a transmit condition.
- -- A chassis connection is made through the push-to-talk switch to activate the relay (in "Private-Line" radios, the push-to-talk switch activates the PL time delay circuit which in turn switches the relay).

The power relay performs the following switching functions:

- -- Filtered A+ is provided to operate the low level transmitter exciter stages.
- -- Regulated 9.1 V is removed from the receiver oscillator and multipliers to turn them off.
- -- Unfiltered A+ is provided to switch the antenna from the receiver input to the transmitter input and to operate the high level transmitter stages.

When the push-to-talk button is released, the following takes place:



THEORY OF OPERATION

1. FUNCTIONAL OPERATION

The overall operation of the radio set is illustrated in the Functional Block Diagram in Figure 1. This diagram applies to both dash and trunk-mount installations.

The dc input to the radio is applied through three separate leads in the following manner:

- -- The primary power (12 volts from the ungrounded side of the battery) is applied to the transmitter via the polarity reversing socket and the relay.
- -- Power for the receiver and low level transmitter stages comes from the ungrounded terminal of the battery and passes through the OFF-ON switch (in the control head) and the polarity reversing socket.
- -- The transmitter keying voltage is connected to both the vehicle ignition switch and the OFF-ON switch in the control head. This gives vehicle ignition control to transmitter operation since the push-to-talk function will be inoperative with the ignition switch turned off.

The function of the polarity reversing socket is to provide voltages of the proper polarity to the radio circuitry in either positive or negative ground installations. With the exception of the audio push-pull output stages, the receiver and some circuits within the transmitter require a voltage which is always positive with respect to chassis. In positive ground systems, this voltage is supplied by the TLN8482A Ground Reversing Kit. In negative ground systems, connections through the polarity reversing socket are supplied by the TLN8427A Negative Ground Kit or by the TLN8482A Ground Reversing Kit (see the INSTALLATION AND OPERATION section of this manual).

When the control head ON-OFF switch is turned on, the receiver is immediately operative and the green lamp on the control head lights, indicating the radio set is ON.

In negative ground operation, battery voltage (A+) is applied to:

- -- The entire receiver.
- -- The transmitter audio amplifier.

-- The PL encoder, decoder, and time delay circuits (in "Private-Line" radio sets only).

A regulated 9.1-volt supply (chassis referenced) is derived from the receiver A+ voltage. This regulated voltage is applied to:

- -- Both the transmitter and receiver oscillators.
 - -- The transmitter IDC circuit.
- -- The PL tone generator (in "Private-Line" radio sets only).
 - -- The time-out timer

In positive ground operation, the chassis referenced A+ is supplied by the converter in the TLN8482A Ground Reversing Kit. Other connections in this kit provide for maintaining the required A+ to A- polarity for the remaining circuits.

When the power ON-OFF switch and the vehicle ignition switch are both turned on, the transmitter is immediately ready for operation. When the push-to-talk button on the microphone is pressed, the following functions are performed:

- -- The red lamp in the control head lights indicating a transmit condition.
- -- A chassis connection is made through the push-to-talk switch to activate the relay (in "Private-Line" radios, the push-to-talk switch activates the PL time delay circuit which in turn switches the relay).

The power relay performs the following switching functions:

- -- Filtered A+ is provided to operate the low level transmitter exciter stages.
- -- Regulated 9.1 V is removed from the receiver oscillator and multipliers to turn them off.
- -- Unfiltered A+ is provided to switch the antenna from the receiver input to the transmitter input and to operate the high level transmitter stages.

When the push-to-talk button is released, the following takes place:

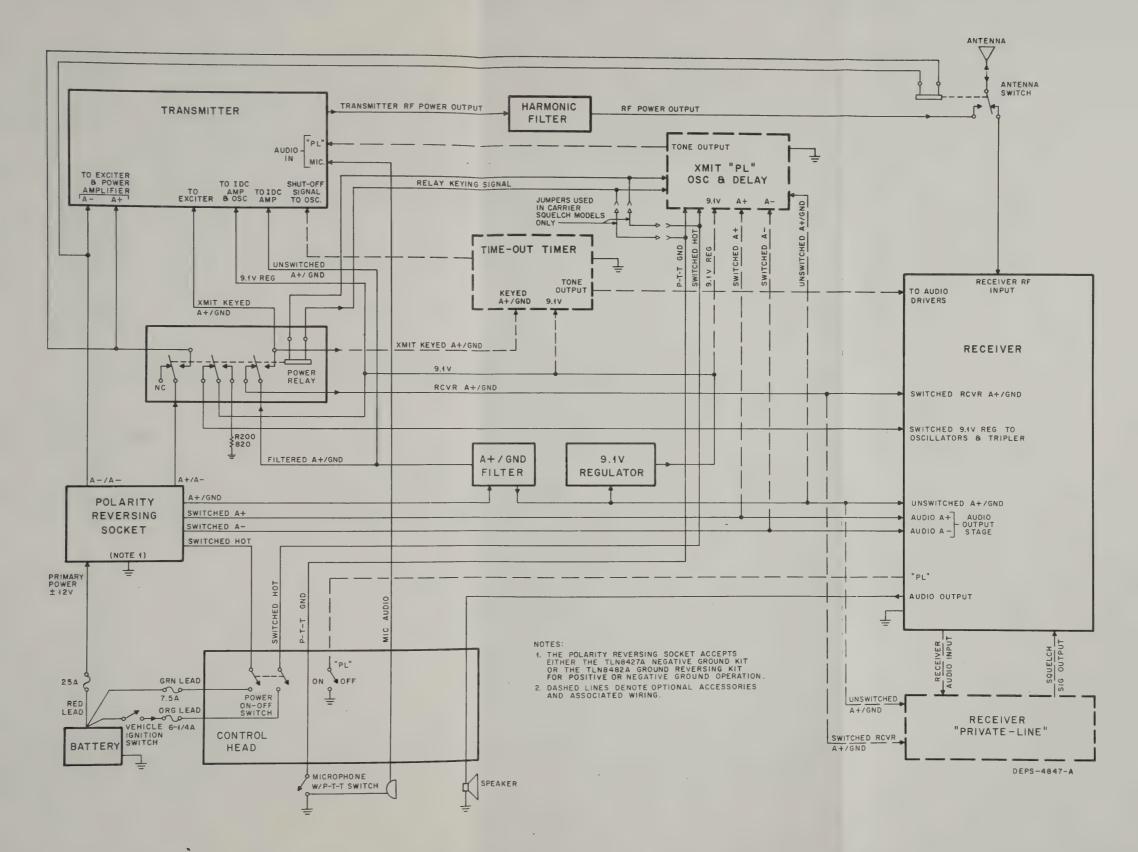
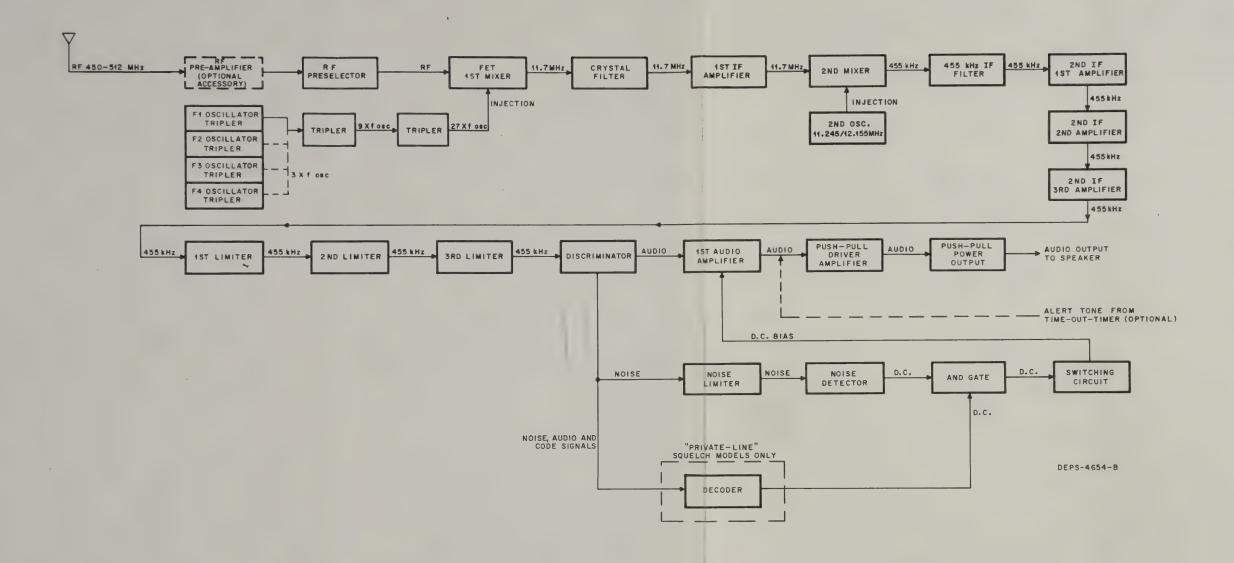


Figure 1.
Functional Block Diagram



a. Carrier Squelch Radios

- (1) The red transmit indicator lamp on the control head goes out.
- (2) The power relay opens to remove A+from all transmitter rf stages. The antenna, filtered A+, and regulated 9.1 V are switched to the receiver.

b. TPL or DPL Coded Squelch Radios

- (1) The red transmit indicator lamp on the control head turns off.
- (2) TPL systems only -- In this system the controlled A+ voltage to the tone generator is removed which causes a phase reversal of the tone output fed to the modulator. The path to the pushto-talk bridge is opened but a delay circuit keeps the transmitter on for approximately 150 milliseconds after release of the push-to-talk switch. During this time, the reverse burst is transmitted which damps the vibration of the "Vibrasponder" resonant reed in the listening receiver and returns it to the squelch condition. After the 150 millisecond delay, the power relay opens to remove all voltages and the radio reverts to receive operation.
- (3) DPL systems only -- In this system the transmit code enable is removed from the DPL encoder; however, a delay circuit keeps the transmitter on for approximately 180 milliseconds after release of the push-to-talk switch. During this time, the DPL encoder generates a turn-off which is transmitted. The turn-off code is decoded in the listening receiver and returns it to the squelch condition. After the 180 millisecond delay, power is removed from the transmitter and the radio reverts to receive operation.

2. RECEIVER

The receiver is a completely transistorized double-conversion superheterodyne type. It receives FM signals on one (or up to four) fixed crystal-controlled frequencies.

The multi-frequency receiver is the same as the one frequency model except for the addition of three oscillator circuits. Only one frequency can be received at a time. A switch on the control head selects the desired operating frequency on multi-frequency models. The frequency selector switch completes a path to ground for the corresponding transmitter and receiver oscillators thus allowing them to operate. (Unusual receive-transmit combinations, such as two frequency transmit and three frequency receive, require minor circuit modifications.) The modifications are covered in the Service Aids Section of this manual.

a. RF Preselector

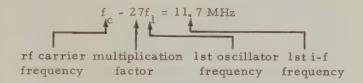
The rf signal received at the antenna is routed to the preselector via the antenna relay. The preselector has a flat noise bandwidth and a steep skirt response to provide rapid attenuation of signals outside the accepted bandwidth. Capacitive and magnetic coupling are used to couple the signal through the resonant cavity apertures. The preselector contains six low-loss, highly selective, helical resonator cavities (L1 through L6).

b. Oscillator-Multiplier

The oscillator circuit(s) consist of either one or four (multi-frequency models) Colpitts oscillators and may contain up to four temperature-compensated crystal resonators. The oscillator output is fed to a two-coil filter (L9 and L10) which is tuned to pass only the third harmonic. The injection signal then passes through two successive tripler stages which raise the frequency to 27 times the crystal frequency. Coils L11, L12 and L13 are tuned to the ninth crystal harmonic. L14, L15, and L16 (high-Q aperture tuned coils) are tuned to 27 times the crystal frequency. The injection output is then applied to the source of the FET 1st mixer.

c. First Mixer

Signals from the rf preselector and multiplier circuits are applied to the first mixer, a field effect transistor (Q1). The injection frequency is below (low side injection) the rf carrier frequency. The mixer heterodynes the two signals to produce the first intermediate frequency (1st i-f) of 11.7 MHz.



d. First Intermediate Frequency (High IF) and Second Mixer

The output from the 1st mixer (Q1) is coupled through a monolithic crystal filter to a common emitter high i-f amplifier circuit (Q5). The crystal filter provides close-in selectivity at alternate and adjacent channels.

The output of the i-f amplifier is coupled to the base of the second mixer (Q6) through a highly selective triple-tuned network consisting of T2, L7 and L8.

The crystal-controlled 2nd oscillator operates below the 1st i-f at 11.245 MHz except in the case where the receiver is tuned near harmonics of this frequency. To avoid interference from these harmonics a crystal which oscillates above the 1sti-f at 12.155 MHz is used.

The 12.155 MHz crystal is 455 kHz above the 11.7 MHz 1st i-f and the 11.245 MHz crystal is 455 kHz below it. The output of the 2nd mixer is the difference between the 2nd local oscillator and the 11.7 MHz i-f. This resulting 2nd i-f frequency is 455 kHz.

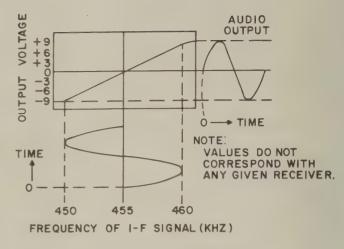
e. Second IF

A "Permakay" 2nd IF Filter precedes the second i-f amplifier circuit. The filter sections are permanently sealed in polyesterstyrene and the filter is unconditionally guaranteed for the life of the receiver, provided the seal is not broken and the housing is not tampered with. This filter is the major factor in determining the bandwidth and selectivity of the receiver. It greatly attenuates the signal outside the pre-determined bandpass. Three i-f amplifier stages follow the 455 kHz filter to saturate the limiter.

f. Limiter Stage

The three limiter stages are 455 kHz amplifiers arranged so that an increase in input signal produces no change in the amplitude of the output signal. Because of more than adequate receiver gain, the limiters are in full saturation at all times, that is, with weak or strong signals or noise only.

When a signal is applied to the N-P-N first limiter, the base is driven negative with respect to the emitter when the signal is negative. This places a reverse bias at the emitter-base junction causing the collector current to drop to zero. When the signal is positive, the base-emitter junction becomes forward biased thus increasing the collector current to its maximum value. Thus, the collector current is driven to both cut-off and maximum. Operation of the second limiter is essentially the same except that the signal undergoes a phase reversal in the first limiter and the P-N-P transistor performs the same functions with its input signal of opposite polarity. output of the limiters is a signal of constant amplitude.



AEPS-1795-0

Figure 3.
Typical Discriminator Response

g. Discriminator

The discriminator used is a phase discriminator, that is, the operation is dependent upon a 90° phase shift which occurs at resonance between the primary and secondary voltages of the tuned transformer.

The discriminator recovers the audio from the 455 kHz i-f signal. A typical discriminator response curve is shown in Figure 3.

The i-f signal varies in frequency at the audio rate. This is shown below the curve. The corresponding audio output is drawn to the right of the curve.

An emitter follower (Q309) is used to prevent possible loading of the discriminator by the audio and squelch circuits.

h. Noise-Actuated Squelch Circuit

The purpose of the squelch circuit is to eliminate disturbing noise which would otherwise be heard at the speaker during intervals between received messages.

The noise-actuated squelch circuit consists of a noise limiter (Q345), noise detector (Q346), and dc control stage or audio switch (Q347).

In the absence of a received rf carrier (SQUELCH control at threshold), noise from the

discriminator is amplified by the noise amplifier limiter. This noise voltage is rectified in the form of drawing more or less current in the noise detector stage. More current is drawn when the receiver is fully squelched (SQUELCH control fully clockwise); less current is drawn when the receiver is in the unsquelched condition.

When the noise detector is drawing heavy current, a less positive voltage is developed at the emitter of the detector. This causes a forward bias to be applied to the switching transistor which, in turn, reverse biases the first audio amplifier stage cutting off that stage. Therefore, the following audio stages do not receive signals and the speaker is quiet.

When an on-frequency signal is received, the noise reaching the squelch circuit diminishes so that there is little or no output from the noise detector. As a result, the audio switch is cut off and the audio amplifier is biased normally. Under these conditions, the incoming signals reach the speaker.

i. Tone-Actuated Squelch Circuit in "Private-Line" Tone-Coded Squelch Models

As shipped from the factory, "Private-Line" receivers incorporate a tone actuated "Private-Line" squelch circuit that works in conjunction with the noise actuated carrier squelch circuit. In this mode the "Private-Line" squelch sensitivity is affected by the carrier squelch sensitivity. Thus the "Private-Line" squelch sensitivity is variable with the setting of squelch control. If desired, the radio can be wired so that the "Private-Line" squelch sensitivity is independent of the carrier squelch control. To accomplish this, insert jumper JU702 and remove jumper JU703. In normal operation, the receiver audio is activated only when both of the following conditions occur: (1) an on-frequency rf signal must be received to disable the carrier squelch circuit and (2) the rf signal must be FM modulated with the proper sub-audible tone frequency to activate the "Private-Line" tone-coded squelch decoder circuit.

The "Private-Line" (PL) decoder circuit consists of a low-pass filter network, a high-gain amplifier, an amplifier/clipper, a "Vibrasponder" driver stage, a "Vibrasponder" resonant reed, an output amplifier, a detector, an output switch stage, and a noise gate switch.

The output from the emitter follower is connected to the low-pass filter network, (L751, C752, C753, C754) which passes frequencies below 300 Hz. The low-frequency signals (PL tone) are amplified

by Q751 and coupled to the input of the amplifier/clipper Q752. The output of the amplifier/clipper is applied to the "Vibrasponder" driver stage to drive the resonant reed.

The "Vibrasponder" resonant reed is a highly selective, contactless, electro-mechanical device which is permanently tuned and sealed at the factory. The reed is energized only when a tone of the precise frequency appears in the discriminator output. When this occurs, the vibrating reed produces a sinusoidal output which is amplified and detected. The detected output is applied to the output switching transistor (Q756) which provides a dc voltage for biasing the switching transistor (Q347). The noise (carrier) squelch detector (Q346) also provides dc voltage for biasing Q347. If both of the voltages exceed a certain level (approximately 10 V), the audio switching transistor (Q347) base-emitter junction will be back-biased and the first audio amplifier (Q340) will conduct.

The PL low-pass filter is paralleled by a high-pass circuit to prevent erratic operation of the "Vibrasponder" reed because of noise. The high-pass filter passes some higher frequency noise components which tend to drive the amplifier/clipper into limiting. The resulting saturation of Q751 effectively reduces the PL squelch sensitivity.

When the proper tone signal is received and the audio pre-driver stage is turned on, the high-pass path is shorted to ground through the noise switch (Q757). With the high frequency noise removed, the PL squelch sensitivity is at maximum to insure an unsquelched receive condition until the end of the transmission.

Since both a carrier and proper PL tone must be present in the receiver to activate the receiver audio, the carrier squelch control affects the PL sensitivity (with the jumper circuit configuration on radio sets as shipped from the factory). For optimum sensitivity, use the procedure outlined in the INSTALLATION AND OPERATION section of this manual.

j. "Digital Private-Line" Binary-Coded Squelch Models

"Digital Private-Line" binary-coded squelch is a system that utilizes a binary code to unsquelch the radio set. The basic operation of this squelch is described in a separate Motorola instruction section, 68P81106E83. This instruction section together with the schematic diagram provides theory and maintenance information for this type of squelch.

k. Audio Circuit

Audio signals from the discriminator are coupled to the first audio stage through the VOLUME control and a high pass filter. The VOLUME control varies the signal level applied to the base of the first audio amplifier. The filter effectively blocks signals below 300 Hz (on "Private-Line" models, additional filtering is provided to more completely suppress the PL tone) and pass the desired audio range of 300-3000 Hz.

The first audio amplifier is reverse biased when the radio set is squelched. The emitter voltage drops below the base voltage to produce the reverse bias condition. In the normal receive condition, the first audio amplifier is forward biased and the output signals are applied to the driver. The drivers are connected in an emitter coupled phase splitter configuration. The capacitor in the base of one driver transistor provides the 6 dB per octave de-emphasis characteristic from 300 to 3000 Hz. As the frequency of the signal increases, the impedance across the capacitor decreases and the resultant signal amplitude decreases. The audio output from the drivers is transformer coupled to push-pull output amplifiers. The output stage provides a 5-watt output to a 3-ohm speaker with less than 5% distortion. Response is within +2, -8 dB of the 6 dB per octave de-emphasis characteristic from 300 to 3000 Hz.

3. TRANSMITTER

a. General

This solid-state transmitter is directly frequency-modulated for crystal controlled operation in the 450-512 MHz range. It consists of an oscillator-modulator, several amplification and frequency multiplication stages and selective filtering to process a carrier signal which is 27 times the fundamental crystal frequency. The Transmitter Block Diagram (Figure 4) shows the stage-by-stage signal flow and operating frequencies.

b. Microphone and Preamplifier Circuit

The Motorola dynamic microphone contains a transistorized preamplifier. The microphone cartridge and preamplifier acts as a variable voltage generator producing an output voltage which varies with both frequency and intensity as the sound waves strike the diaphragm.

c. Deviation Limiting Circuit

(1) A-Suffix Main Board Models

The output waveform from the microphone is connected to the deviation limiting circuit. The deviation limiting circuit consists of components for pre-emphasizing, amplifying and limiting the input waveform.

C196, R196, C191, and the input impedance of the IDC Amplifier comprise an audio shaping network which yields a 6 dB per octave pre-emphasis response below 3 kHz and a flat response above 3 kHz. After pre-emphasis, the audio signal is amplified by Q101 and Q102. Negative feedback (R186 and R187) is used to maintain constant gain and low audio distortion. Amplitude peaks are clipped when Q102 is driven to saturation (fully on) or cut-off (fully off). The peak-to-peak amplitude is limited to 9.1 volts by Zener diode CR181.

The pre-emphasized, amplified and clipped microphone audio passes through the splatter filter (L180, C188, C194, and C195) to the base of the emitter follower (Q103). (The PL tone is injected at this point on PL models.) The emitter follower isolates the modulator load from the splatter filter thus insuring proper splatter filter response. An IDC adjustment potentiometer is provided for each oscillator (R101, R102, R103, R104). It is necessary to set the deviation for each channel in a direct FM system because the modulator sensitivity is related to the individual oscillator characteristics.

(2) B-Suffix Main Board Models

Refer to exciter schematic diagram EEPS-4699-F. Microphone audio is applied to the deviation limiting circuit, which provides preemphasis, amplification, and audio limiting.

Coupling capacitor C182 and the input resistance of the audio amplifier stage (Q100) provide 6 dB per octave pre-emphasis.

The audio signal from the microphone is amplified by Q100 and is applied to the "IDC" limiter. The IDC limiter consists of complementary-connected transistors Q101 and Q102, and their associated components. Capacitor C185, with the base and emitter resistances of Q101, and C186, with the base and emitter resistances of Q102, form a high-pass filter with a cut-off frequency of about 200 Hz. The single-ended output from the collectors of Q101 and Q102 is

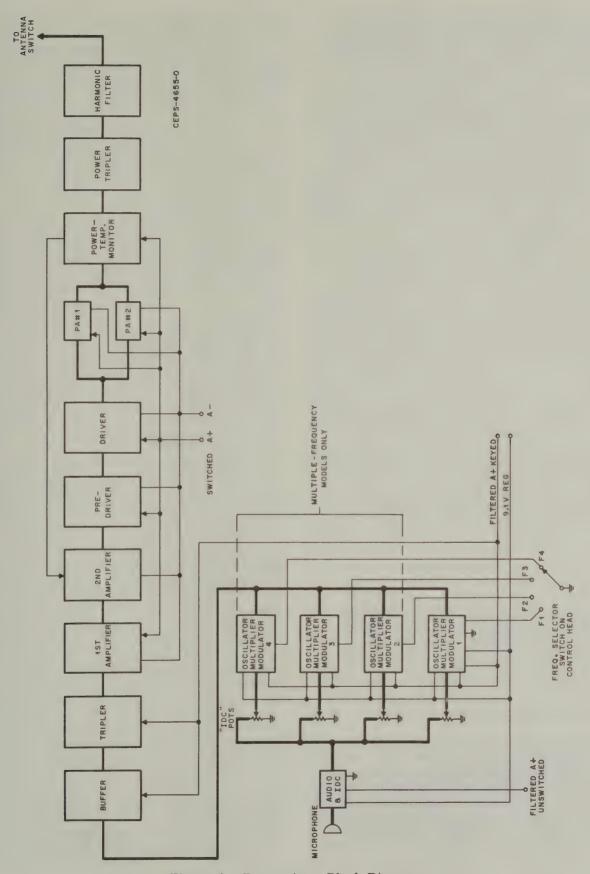


Figure 4. Transmitter Block Diagram

applied to the input of emitter follower Q103. Emitter-to-base and collector-to-base feedback paths are provided to ensure a symmetrical input waveform at the input of the emitter follower.

The limited audio signal passes through splatter filter L180 and C188 to the base of Q103. The PL tone is also applied to the base of Q103 in PL model radio sets. The emitter follower isolates the modulator load from the splatter filter to ensure proper splatter filter response. An IDC adjustment potentiometer is provided for each oscillator. It is necessary to set the deviation for each channel in a direct FM system because the modulator sensitivity is related to the individual oscillator characteristics.

d. Modulator-Oscillator-Multiplier Stage

The combination modulator-oscillator-multiplier stage generates a modulated rf signal at three times the fundamental crystal frequency. The direct frequency modulator consists of the parallel combination of a varactor and warping coil connected in series with the crystal. A change in capacitance seen at the crystal terminals will cause the crystal to vary its resonant frequency in proportion to the capacitance change. The audio voltage from the audio and IDC circuitry is applied to the varactor to cause a change in capacitance; this variation in turn causes the frequency to change at the same audio rate. The double-tuned circuit, L102 and L103 at the output of the oscillator transistor(s), tunes to the desired third harmonic of the crystal.

NOTE

Because the frequency adjustment coils (L101, L107, L108, L109) and the modulator circuitry are combined, THE TRANSMITTER FREQUENCY MUST BE PROPERLY ADJUSTED BEFORE SETTING THE TRANSMITTER DEVIATION WITH THE "IDC" CONTROL. Refer to the transmitter alignment procedure for details.

e. Multiplier and Amplifier

From the modulator, the rf signal is amplified by Q105 and applied to Q106, which is a class C multiplier that triples the signal frequency. The tripler output is next amplified by Q107. All of the rf circuitry up to this point is contained in the exciter. The rf output frequency of the exciter is 150.0 to 170.7 MHz, with a nominal power output of 500 milliwatts.

f. Power Amplifier

The power amplifier (Q108, Q109 and Q110) consists of three class C amplifiers and two final amplifiers (Q111, Q112) arranged in a push-pull configuration. The stages are coupled by low Q broadband capacitive matching networks such that only two tuning elements (C102, C103) are required in the entire power amplifier circuit. The power output from the amplifier chain is nominally 50 watts at approximately 150 MHz.

g. Power Tripler

The 150 MHz output from the power amplifier is fed through a broadband matching network to the power varactor CR640. The non-linear characteristic of the varactor causes the rf input signal to be frequency doubled (to approximately 300 MHz) The 300 MHz signal is then passed through the non-linear varactor a second time during which the 300 MHz signal and the 150 MHz input signal are heterodyned to produce a 450-512 MHz signal, the desired carrier frequency. The power tripler output is coupled through the output matching network (L642, C104, L643, and C642) to the bandpass harmonic filter and the antenna switch.

h. Power-Temperature Monitor

A series regulator (Q113) is the collector feed of the 2nd amplifier and it protects against harmful conditions which cause power amplifier overdissipation such as antenna mismatch, high battery voltage or excessively high temperatures.

A directional coupler is used to sense forward power levels. By sensing the forward power, the output level can be stabilized within safe, controlled levels of transistor dissipation. The forward power level is detected by CR670 and applied to trigger amplifier Q115. The trigger level of Q115 is determined by potentiometer R105. Once Q115 is triggered, dc amplifiers Q116 and Q117 are turned on. Normally Q118 and Q113 are saturated. However, when Q117 turns on, Q118 and Q113 drop out of saturation, thus reducing the dc voltage supplied to rf amplifier Q108. RF power output from Q108 is reduced when its dc supply voltage falls. RF drive to the power output are thereby reduced.

Thermistor RT670 monitors the varactor temperature and reduces rf drive to the power tripler to prevent varactor overdissipation under conditions of high ambient temperatures and excessively long transmitter keying. Under these

conditions, communications can be maintained at a reduced power level. R685, R686 and RT670 base bias Q115 at high temperatures thus causing a reduced A+ voltage to the 2nd amplifier. Short circuit protection for the 2nd amplifier supply line is achieved by current limiting Q118 with CR673, CR674 and R689.

i. "Private-Line" Tone Generator

This tone generator consists of a transistorized two-stage oscillator and "reverse burst" switching circuit. The frequency determining element of the oscillator is a Motorola "Vibrasender" resonant reed (an electro-mechanical equivalent of a parallel-tuned high Q tank circuit). The oscillator operates continuously when the radio set is turned on. The oscillator output is amplified by Q706 and Q707 and is then injected into the transmitter audio - IDC circuit.

The oscillator circuit is made up of Q704, Q705, the "Vibrasender" resonant reed and the bias circuitry. The oscillator tone output is taken from the collector of Q705 or from resistor R724 in the emitter circuit of Q705. The selection of these two paths is determined by diodes CR710 and CR711. When the transmitter is keyed, the push-to-talk lead is connected to the grounded battery terminal. The diode bridge (comprised of CR701, CR702, CR703 and CR704) causes Q701 to turn on. When this happens, CR710 becomes reverse biased and CR709 is forward biased through R728, R730 and R731. The tone oscillator output is now taken from R724. When the pushto-talk button is released, Q701 is turned off and CR710 is now forward biased through R725, and R729. Diode CR709 becomes reverse biased and the tone output is now taken from the collector of Q705. The 180° phase shift between the two tone paths gives a "reverse burst" of tone just after the push-to-talk button is released. This tone prevents "squelch tail" from occurring in the receiver by quickly damping the "Vibrasponder" resonant reed. Even though the push-to-talk button is released, the transmitter remains "on" for approximately 150 milliseconds so that the "reverse burst" of tone may be transmitted. This delay is accomplished by Q702 and Q703 which comprise the "reverse burst" switching circuitry. When the transmitter is keyed, Q701 and Q703 are immediately turned on. Q703 supplies current to the transmit/receive relay. When the push-to-talk button is released, Q701 and Q702 are turned off but Q702 turns on again after capacitor C701 is discharged through R705. It should be noted that during the discharge time (approximately 150 milliseconds) Q702 is off and Q703 is on. Finally

as Q702 is turned on, Q703 is turned off. This action removes the voltage from the relay which turns off the transmitter.

j. "Digital Private-Line" Encoder

The encoder is contained in an integrated circuit which generates a 23-bit code word during the transmit cycle and a turn-off code for approximately 180 milliseconds after PTT. These signals are applied to the transmitter audio-IDC circuit. For complete description refer to the schematic diagram and separate instruction section 68P81106E83.

4. RECEIVER PREAMPLIFIER (OPTIONAL)

The preamplifier is a single stage grounded gate FET (field effect transistor) rf amplifier which connects between the antenna switch and receiver rf deck. It improves receiver sensitivity 6 dB from the specified receiver 20 dB quieting sensitivity of .5 microvolt.

The signal from the antenna is coupled directly into the input tuned-line of the preamplifier. This tuned-line passes the desired signal and matches the relatively low FET input impedance to the 50-ohm input line. The signal is capacitively coupled to the source terminal of the FET where it is amplified and then capacitively coupled to the output tuned-line. The output tuned-line is a high Q tank circuit. It passes the desired signal and matches the relatively high FET output impedance to the 50-ohm output line.

5. GROUND REVERSING KIT (OPTIONAL)

a. Description

These kits, available on special request adapt "Mocom • 70" radio sets to vehicles with either negative or positive ground electrical systems.

The unit consists of a converter circuit mounted in a compact housing with a plug for insertion into a mating receptacle located in the radio set. Rotating the unit 180° and reinserting it into the receptacle adapts the radio set for the opposite input polarity. The two input polarities are marked on the unit at opposite ends and an arrow on the polarity plug plate identifies the orientation of the unit.

b. General Circuit Operation (Refer to Schematic Diagram)

When the unit is inserted in the power receptacle in the negative ground position, input polarity to the converter circuit is such that it does not operate. Wiring of the unit connects the dc input directly to the radio set with the proper polarity.

When the ground reversing kit is positioned for positive ground operation, a multivibrator switching circuit feeds the input current into the primary side of a toroid transformer. To produce 12 volts referenced to the chassis, A+ with respect to ground, the output from the transformer secondary (approximately 15 volts) is rectified, filtered and referenced to the battery positive terminal, which is the radio chassis. A limiter circuit in the output of the unit prevents damage to the switching transistors under a shorted output condition.

DC starting is provided by resistor R202, which feeds current from the positive input through the base-drive windings of the transformer to the base of the switching transistors. Reverse polarity protection is provided by series diode CR202, in the primary circuit negative-return lead.

c. Starting and Running

When voltage is applied to the converter, assume that Q201 conducts more than the other switching transistor because of a small imbalance in the circuit. The resulting increase in voltage across the primary of the transformer induces a voltage in the feedback winding of a polarity that will cause transistor Q201 to be driven into saturation and Q202 to be reverse biased and driven into cutoff. As the transformer saturates, causing no change in the flux density, the drive to the base of Q201 is reduced and the collector current begins to decrease. This causes a change in the flux in the opposite direction that drives Q201 into cutoff and forward biases Q202, turning it on. Q202 then operates as Q201 did in the initial half cycle.

d. Output Circuit

The output limiter circuit uses Q204 as a short-circuit detector to control the base drive of a saturated switching transistor (Q203) connected in series with the positive output lead. If the output is short circuited, the output voltage falls and removes the drive voltage to the short-circuit detector (Q204). As Q204 turns off, the base drive to Q203 is removed forcing it into cutoff.

This causes the 680-ohm resistor (R205), connected from the collector to the emitter of Q203, to appear as the load so that the converter operates correctly with a 680-ohm load instead of a short circuit load.

e. Conversion of Negative Ground Only Radio Sets to Positive or Negative Ground Operation

Remove existing plug P201 (TLN8427A Negative Ground Kit) from the radio and replace it with the TLN8482A Ground Reversing Kit. Insert this plug-in unit so that the arrow on the polarity plug plate points to the same ground polarity on the kit as that of the vehicle electrical system.

6. TIME-OUT TIMER (OPTIONAL)

(Refer to Schematic Diagram)

The time-out timer circuitry (mounted on the polarity plug plate) is used to turn off the transmitter and activate the receiver audio to generate an alert tone if the radio set is keyed continuously for more than one minute.

Once the timer has timed out, it may be reset for another minute by simply unkeying and then keying the transmitter.

When the radio set is in the receive condition, keyed A+ with respect to ground is removed, therefore, diode CR251 is reverse biased and transistor Q251 is saturated by the bias applied to its base via resistors R253 and R254. the transmitter is keyed, the keyed A+ with respect to ground forward biases diode CR251 and reverse biases the base emitter junction of Q251, turning it off. With Q251 cut-off, capacitor C251 starts to discharge through resistor R255. During this discharge time the emitter transistor Q252 is held at approximately 2.7 volts by the combination of resistors R256 and R257. This emitter voltage holds Q252 at cutoff. After a one minute period, the voltage across capacitor C251 drops to approximately 1.6 volts. At this time, diode CR252 becomes forward biased turning on transistor Q252 which supplies sufficient gate current to fire the silicon controlled rectifier (SCR) SCR251. When the SCR conducts, the basecollector junction of transistor Q253, which serves as a diode, becomes forward biased causing transistor Q250 to shut off. On radio sets equipped with a time-out timer, Q250, normally acts as an emitter follower and is the A+ voltage source for the transmitter oscillator-modulator. Thus, when Q250 is shut off, the transmitter is shut off.

When the transmit-receive relay opens, transmitter keyed A+/GND drops to zero thereby permitting SCR251 to reset.

When the SCR conducts, the unijunction transistor (Q255) oscillates at an audio frequency. The output from oscillator Q255 is fed through capacitor C255 and R252 to the audio drivers in the receiver as the alert tone. The amplitude of the alert tone may be changed by changing the value of R252 (at no time should R252 be less than 47K ohms). The table on the schematic diagram shows the amplitude variations in speaker output, for different selected values of R252. Biasing voltages for these stages are supplied via resistor R251 and diode CR253 when the keyed A+ with respect to ground is applied.

7. AUTOMATIC PILOT LIGHT DIMMER CIRCUIT

(Refer to applicable Schematic Diagram)

The pilot light dimmer circuit automatically controls the brilliance of the green (receive) pilot light mounted on the control head. In bright daylight, the light glows brightest to insure visibility. The light becomes progressively dimmer to reduce excessive glare as daylight

changes to darkness. External illumination is sampled through a window in the lower portion of the control head and acts upon a light detecting resistor which is mounted behind the window.

When the radio is turned on, transistor Q501 conducts. Its collector current flows through the green pilot light, DS501. The light detecting resistor (LDR) R513, which is part of the base biasing network for Q501, controls the base current flowing into the transistor. Consequently, the current passing through the green pilot light is inversely related to the resistance of R513 (LDR).

The resistance of the LDR is controlled by the amount of light striking it (the resistance decreases as the light intensity increases and vice versa). During daylight operation (LDR resistance low), the collector current of Q501 is high and the light glows brightly. During night time operation (LDR resistance high), the collector current of Q501 is low and the light glows dimly.

The diode bridge (comprised of CR501, CR502, CR503, and CR504) is a polarity switching network which permits dimmer circuit operation in both positive and negative ground systems.

MAINTENANCE

1. RECOMMENDED TEST EQUIPMENT

All of the recommended test equipment for aligning and testing the radio set is listed in the TABLE OF RECOMMENDED TEST EQUIPMENT. The listed items or their equivalent should be used.

2. TRANSMITTER SERVICING

a. Alignment Procedure

Instructions for aligning the transmitter are provided in the Transmitter Alignment Procedure of this manual. Refer to these instructions for all information pertaining to transmitter tuning.

b. Metering the Transmitter

A 12-pin metering receptacle for connecting a Motorola \$1056B to \$1059B Series Portable Test Set is located in the exciter circuit on the main radio board. A Motorola Model SKN6012B Metering Cable must be used to connect the portable test set to the metering socket. Typical meter readings are given in the Transmitter Alignment Procedure. If meter readings differ greatly from those in the table, check the transmitter for defective components or improper alignment.

c. Power Output

Connect a wattmeter at the antenna receptacle on the front panel of the radio set and take a power reading. If rated power output is not obtained (25 watts) proceed with meter readings.

d. Meter Readings

Connect the portable test set to the transmitter metering socket and set the function selector switch of the test set to the XMTR position. Take readings and compare them with the values tabulated in the Transmitter Alignment Procedure, or preferably, compare them with the set of readings taken the last time the transmitter was serviced.

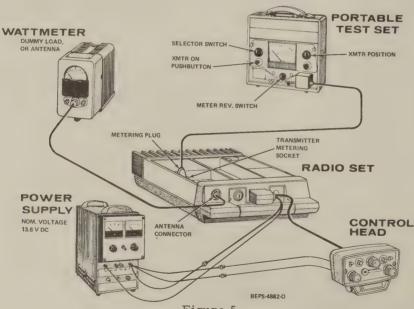


Figure 5.
Exciter and Power Amplifier Test Set-Up

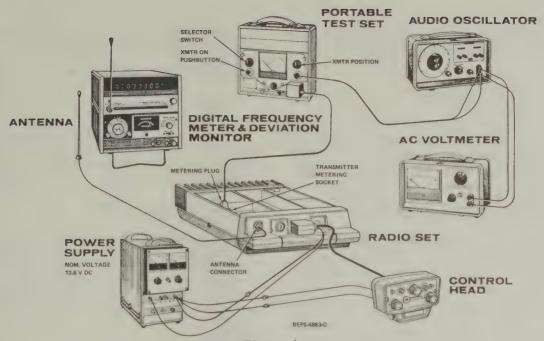


Figure 6.
Frequency, Deviation and Audio
Sensitivity Test Set-Up

e. Troubleshooting the Transmitter

If exciter meter readings are abnormal, the malfunction can be isolated by checking the appropriate stages for proper dc signal voltages. DC readings should be made with either a high impedance voltmeter or a VOM as noted on the schematic diagram, and compared to the readings on the schematic diagram or previous voltage data on the unit. It should be noted that the class C stages Q106, Q110, Q111 and Q112 will show reverse bias on the emitter-base junction. This is normal, due to the self-bias generated by the transmitter when driver is present. Consequently, this can be used as an indication of drive to a particular stage.

The ac signal readings given in TABLE III may be used as a guide to isolating a defective stage. Also, typical transmitter audio and rf waveforms are shown on the schematic. An rf probe and high impedance dc voltmeter can be used for the rf readings. The audio stages will require a sensitive ac voltmeter.

Voltage and resistance checks of the suspected stage in the exciter or power amplifier section should isolate the defective component.

If all meter readings and rf voltages are normal and there is no power output, check all connectors on the harmonic filter and antenna switch. If necessary, remove the power tripler in the manner illustrated in Figure 12.

Check the varactor diode with a volt-ohm meter to measure the dc resistance in both directions (an electronic voltmeter will <u>not</u> give valid readings in this application). A low impedance should be read in one direction and 5.6k in the other. If 5.6k is measured in both directions, the diode is open. Remove diode as shown in Figure 15 and replace. If a low impedance is read in both directions, remove the diode and check it by itself. If the diode tests good, check all parts in the matching networks for short circuits.

If the ohmmeter readings are correct, use a high impedance dc voltmeter to measure the voltage from diode to ground when the transmitter is keyed. A voltage of approximately -20 V dc should be read. If no voltage is measured, check the input cable and matching network for open circuits or loose connections.

f. Frequency and Audio Sensitivity

Check transmitter frequency and modulation sensitivity. No more than 140 mV rms and no less than 70 mV rms of 1000 Hz audio signal applied (through a capacitor) at the microphone receptacle should be required to produce 3.0 kHz deviation. If the transmitter cannot be "warped" to the proper frequency, check the regulator

voltage (9.1 V dc). Replace the resonator, varactor diode, or other oscillator components if necessary.

g. "Private-Line" Encoder

If transmitter deviation with PL tone applied is improper, check the tone oscillator and tone amplifier circuits. The typical ac signal levels, given in TABLE I, were measured with a Motorola Transistorized AC Voltmeter. Signal levels may vary widely depending upon the frequency of the "Vibrasender" Resonant Reed.

The phase of the signal at the tone generator output should reverse when the transmitter is keyed and revert to the original condition immediately when unkeyed. The "Vibrasender" Resonant Reed can be checked quickly by plugging it into a Motorola SLN6221A "Private-Line" Tone Generator. If a tone output is generated, the reed is good. Make dc voltage checks and resistance checks to isolate the defective part.

If "squelch tail" noise bursts are heard in listening receivers, check voltages in the "reverse burst" switch circuit of the transmitting station. DC voltages given on the schematic are for the transmitter keyed condition. Figure 7 shows the important transient waveforms which should be seen in the "reverse burst" circuitry when the transmitter is unkeyed.

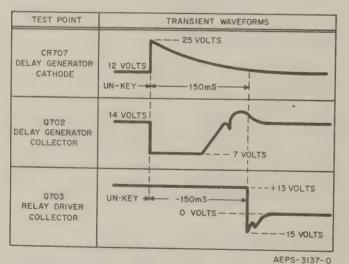


Figure 7.

Transients Appearing in "Private-Line" Delay Circuit After the Transmitter is Unkeyed

h. "Digital Private-Line" Code Generation

If transmitter deviation with "Digital Private-Line" binary signals applied is improper, refer to separate Motorola instruction section 68P81106E83 for information on setting deviation.

3. RECEIVER SERVICING

a. Alignment Procedure

Instructions for aligning the receiver are provided in the Receiver Alignment Procedure of this manual. Refer to these instructions for all information pertaining to receiver tuning.

b. Metering the Receiver

A 12-pin metering receptacle for connecting a Motorola S1056B to S1059B Series Portable Test Set is located near the discriminator transformer on the main radio board. A Motorola Model SKN6012B Metering Cable must be used to connect the portable test set to metering socket.

c. Receiver Sensitivity

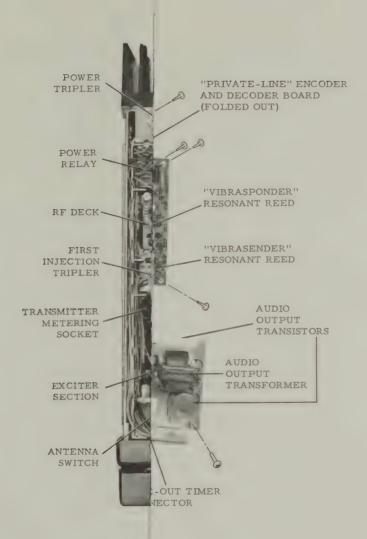
The sensitivity measurement is a relatively simple means for making a very comprehensive check on receiver overall gain distribution and general operating performance. The sensitivity check should be among the first measurements made when a receiver malfunction is suspected.

Receiver sensitivity can be determined by using either the EIA-SINAD method or the 20 dB quieting method. The SINAD method is certainly the better of the two since the use of a modulated carrier gives a check on receiver bandwidth and audio power output; two performance characteristics which the quieting method by and large ignores. Quieting sensitivity, however, is by far the simpler measurement and, consequently, is the measurement generally performed in the field. The procedures for both measurements are given here.

(1) 20 dB Quieting Sensitivity: Specification = 0.50 uV or less (0.25 uV or less with preamplifier)

The 20 dB quieting sensitivity of a receiver is the minimum value of unmodulated rf generator voltage which will reduce the receiver noise output by 20 dB (1/10th of the initial noise voltage).

To conduct the test, an rf signal generator must be connected to the receiver antenna input and the receiver audio output terminated in its proper load (3-to 4-ohms) with means provided to measure the audio output level. (Either an audio vtvm or a Motorola S1056B to S1059B Series Test Set may be used.)



voltage (9.1 V dc). Replace the resonator, varactor diode, or other oscillator components if necessary.

g. "Private-Line" Encoder

If transmitter deviation with PL tone applied is improper, check the tone oscillator and tone amplifier circuits. The typical ac signal levels, given in TABLE I, were measured with a Motorola Transistorized AC Voltmeter. Signal levels may vary widely depending upon the frequency of the "Vibrasender" Resonant Reed.

The phase of the signal at the tone generator output should reverse when the transmitter is keyed and revert to the original condition immediately when unkeyed. The "Vibrasender" Resonant Reed can be checked quickly by plugging it into a Motorola SLN6221A "Private-Line" Tone Generator. If a tone output is generated, the reed is good. Make dc voltage checks and resistance checks to isolate the defective part.

If "squelch tail" noise bursts are heard in listening receivers, check voltages in the "reverse burst" switch circuit of the transmitting station. DC voltages given on the schematic are for the transmitter keyed condition. Figure 7 shows the important transient waveforms which should be seen in the "reverse burst" circuitry when the transmitter is unkeyed.

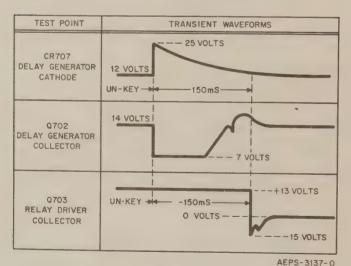


Figure 7.

Transients Appearing in "Private-Line" Delay Circuit After the Transmitter is Unkeyed

h. "Digital Private-Line" Code Generation

If transmitter deviation with "Digital Private-Line" binary signals applied is improper, refer to separate Motorola instruction section 68P81106E83 for information on setting deviation.

3. RECEIVER SERVICING

a. Alignment Procedure

Instructions for aligning the receiver are provided in the Receiver Alignment Procedure of this manual. Refer to these instructions for all information pertaining to receiver tuning.

b. Metering the Receiver

A 12-pin metering receptacle for connecting a Motorola S1056B to S1059B Series Portable Test Set is located near the discriminator transformer on the main radio board. A Motorola Model SKN6012B Metering Cable must be used to connect the portable test set to metering socket.

c. Receiver Sensitivity

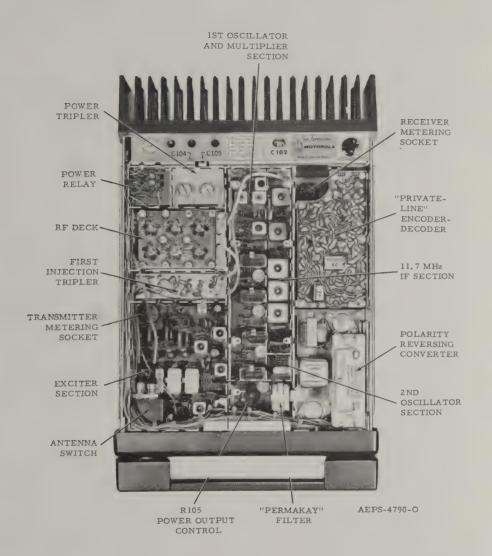
The sensitivity measurement is a relatively simple means for making a very comprehensive check on receiver overall gain distribution and general operating performance. The sensitivity check should be among the first measurements made when a receiver malfunction is suspected.

Receiver sensitivity can be determined by using either the EIA-SINAD method or the 20 dB quieting method. The SINAD method is certainly the better of the two since the use of a modulated carrier gives a check on receiver bandwidth and audio power output; two performance characteristics which the quieting method by and large ignores. Quieting sensitivity, however, is by far the simpler measurement and, consequently, is the measurement generally performed in the field. The procedures for both measurements are given here.

(1) 20 dB Quieting Sensitivity: Specification = 0.50 uV or less (0.25 uV or less with preamplifier)

The 20 dB quieting sensitivity of a receiver is the minimum value of unmodulated rf generator voltage which will reduce the receiver noise output by 20 dB (1/10th of the initial noise voltage).

To conduct the test, an rf signal generator must be connected to the receiver antenna input and the receiver audio output terminated in its proper load (3-to 4-ohms) with means provided to measure the audio output level. (Either an audio vtvm or a Motorola S1056B to S1059B Series Test Set may be used.)



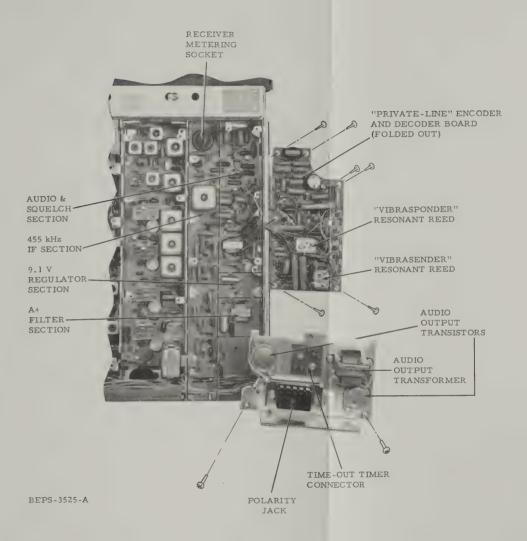
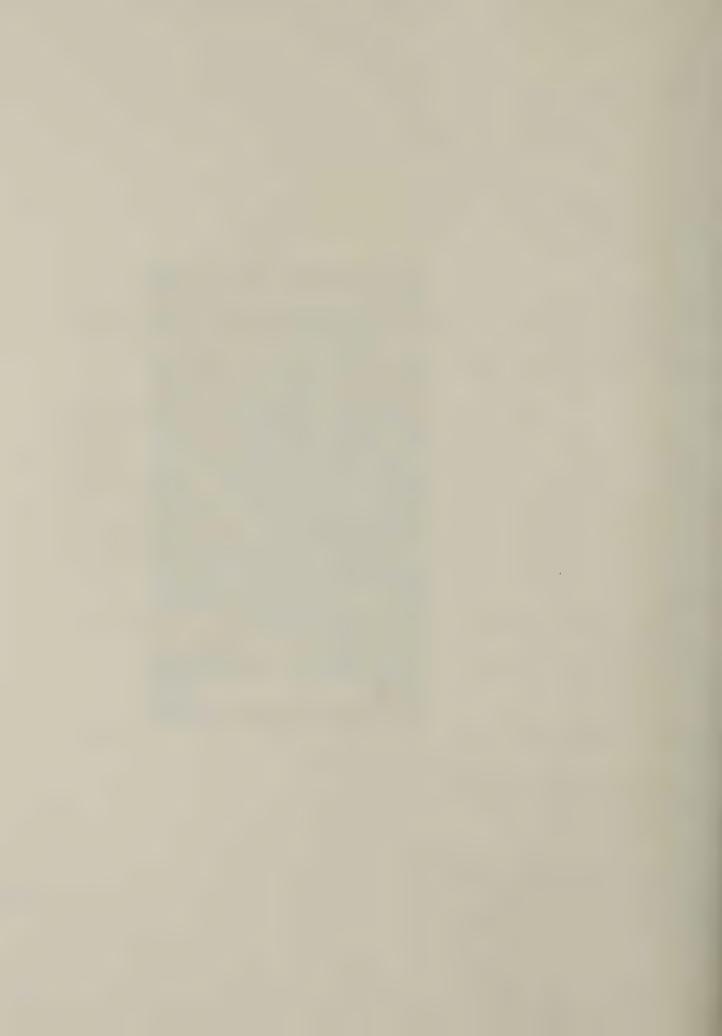


Figure 8.
Radio Set Location Detail



PORTABLE TEST SET RESIGNAL SELECTOR SWITCH GENERATOR CVR POSITION OSCILLATOR & METER REVERSING SWITCH METER CABLI MULTIPLIER SWITCH METERING PLUG RECEIVER METERING 222233 **POWER SUPPLY** RADIO SET NOM, VOLTAGE 13.8 V DC ANTENNA CONTROL 000 Figure 9.

RF and IF Test Set-Up

With the signal generator initially turned off the carrier frequency, adjust the receiver audio volume control, located on the radio set control head, for 1.0-volt rms audio noise output. (Switch position 11 on the test set.) Note that the squelch control should be turned fully counterclockwise (receiver unsquelched) for this test. On "Private-Line" or "Digital Private-Line" squelch models, the radio must be out of the PL mode.

With the signal generator initially adjusted for a substantial rf input to the receiver (1000 uV), set the generator frequency on the carrier frequency and carefully adjust for discriminator "0" (switch position 4 on the Motorola test set).

The signal generator output is then reduced until the audio output noise level increases to 0.1 V rms. This generator input level is the receiver 20 dB quieting sensitivity.

(2) 12 dB Sinad Receiver Sensitivity:

Specification = 0.35 uV or less (.18 uV or less with preamplifier)

The EIA definition for sensitivity of a receiver is the minimum value of the modulated rf generator voltage which will produce at least 50% of the receiver's rated audio power output with a (signal + noise + distortion) to (noise + distortion) ratio (SINAD radio) of 12 dB.

To conduct the test, an rf signal generator frequency modulated with 1000 Hz at ±3.0 kHz deviation, must be connected to the receiver antenna input and the receiver audio output terminated in its proper load (3 to 4 ohms) with means provided to measure audio output level and to "eliminate" the 1000-Hz signal.

The most convenient elimination device is a total harmonic audio distortion analyzer, which is also used as the output level indicator; however, any other filter device having an attenuation of at least 40 dB at 1000 Hz and effectively 0 dBattenuation below 900 Hz and above 1100 Hz (up to 3000 Hz or more) can be used in conjunction with a very high impedance audio voltmeter.

The Motorola Model \$1067B Audio Oscillator can be used as a band elimination filter and, when used with an audio voltmeter, provides a convenient means for making this measurement.

With the signal generator initially adjusted for a substantial rf input to the receiver (1000 uV), the generator frequency is carefully adjusted for discriminator "0" (switch position 4 on the Motorola Portable Test Set) and the receiver audio VOLUME control, located on the radio set control head, adjusted to provide an indication of the 5 watts rated audio power output (4 volts across 3-ohm load or 4.5 volts across 4-ohm load). Note that the SQUELCH kontrol on the

radio set control head should be turned fully counterclockwise (receiver unsquelched) for this test. On "Private-Line" or "Digital Private-Line" squelch models, the radio must be out of the PL mode.

The signal generator output is then reduced to a low level (. 35 uV) and the audio output level noted. The 1000 Hz elimination filter is switched into the circuit and the level difference observed. If the difference is 12 dB (level reduced to one-quarter of the previous voltage) generator input level is the receiver sensitivity. If the difference is either more or less than 12 dB, the generator attenuator must be adjusted slightly until 12 dB is reached and the new attenuator setting is the sensitivity figure. Should the receiver audio output fall to less than 2.5 watts, with the elimination filter switched out of the circuit, as a result of the test, the generator output must be increased until 2.5 watts is reached and this setting is the receiver sensitivity, even though the SINAD will be greater than 12 dB.

d. Meter Readings

Connect the portable test set to the receiver metering socket and set the function selector switch to the RCVR position. Check the meter readings (with no carrier signal) and compare with the typical readings given in Figure 10.

FIGURE 10.
TYPICAL RECEIVER METER READINGS
WITH NO CARRIER SIGNAL

Selector Switch Position	Typical Meter Readings in uA	Stage
1	0	Base of 3rd 455 kHz amplifier
3	18	Base of Injection Tripler
4	0	Discriminator Secondary
5	25	Discriminator Primary
6	18	lst Oscillator Activity

Set the signal generator on carrier frequency and set the level for a 10-microamp reading in meter position 1. If more than 10.0 uV (5.0 uV with preamp) of carrier signal is required for a 10 uA reading on meter position 1, the receiver gain is low. Check for low mixer injection voltages (paragraph e) and improper receiver gain distribution (paragraph g).

A low meter reading in positions 3 or 6 indicates that the 1st mixer injection is probably low. Refer to paragraph e.

A low meter position 5 reading indicates that the 455 kHz amplifier strip is not operating correctly. Refer to paragraph h.

e. Injection Voltages

With no signal into the receiver, measure the rf voltage on the base of the second mixer (Q6). This voltage should be between 40 and 80 mV.

The best method of determining whether or not the 1st mixer injection signal is adequate is to measure the change in mixer drain-to-source dc current when the resonator is removed. This current is proportional to the voltage drop across R1. Consequently, injection level can be determined by measuring the voltage drop across R1 with a sensitive dc multimeter. With the resonator removed, the typical voltage drop across R1 should be 0.10 V dc. Insertion of the resonator should increase this voltage by at least 0.02 volts.

If either injection voltage is low, check the corresponding oscillator for poor solder connections or defective components. Usually a check of dc voltages in the faulty circuit will pinpoint the source of trouble.

f. Preamplifier Servicing (When Optional Preamplifier is Used)

If a preamplifier malfunction is suspected, the preamplifier should be bypassed and basic receiver operation checked by itself. This is accomplished by disconnecting the rf input plug from the preamplifier and connecting it directly to the rf deck. Connected in this manner, the receiver should meet all specifications and mesurements as described for the receiver without a preamplifier. If the receiver is operating normally, remove and repair the preamplifier.

Preamplifier gain can be most easily checked in the following manner using an rf signal generator and a Motorola test set. Set the signal generator on carrier frequency and measure the input level required to produce a reading of 10 uA on meter position 1. Next bypass the preamplifier as described above, retune L1 on the rf deck for maximum indication on meter position 1, and again measure the signal level required to produce 10 uA on meter 1. The difference between the two rf

input levels is equal to the gain of the preamplifier and should be greater than 6 dB and less than 12 dB.

EXAMPLE:

RF Input for 10 uA on Mtr 1 with Preamp = -103 dBm (1.6 uV)RF Input for 10 uA on Mtr 1 without Preamp = -96 dBm (3.5 uV)Preamp Gain = 7 dB

To remove the preamplifier for servicing, disconnect the input and output rf cables, unsolder the brown-red A+ lead, and remove the two screws which fasten the preamplifier to its mounting bracket.

g. Receiver Gain Distribution + Low Level RF and IF Stages

The simplest method for checking the gain distribution of a receiver is to apply an on-channel rf voltage to the antenna connector while monitoring a selected point in the receiver with an rf voltmeter. The amount of signal necessary to produce a specific reading on the voltmeter gives an indication of the total gain between the antenna connector and the point being monitored. The amount of signal required to produce this reading can then be compared with the values given in TABLE IV and TABLE V. Any significant difference between measured and tabulated values indicates that some circuit between the antenna and the point being monitored is not operating correctly. The faulty circuit can usually be isolated after monitoring several points, whereupon a visual inspection of soldered connectors or a dc voltage check will pinpoint the problem area.

h. High Level 455 kHz Stages

The last three 455 kHz stages should limit receiver noise when no carrier signal is present. Some typical rms noise voltages on the three limiter stages are given in TABLE VI. (All voltages were measured with a Motorola dc multimeter using the rf probe and are referenced to chassis ground.)

The recovered audio noise voltage (as measured at the collector of Q307 with an audio vtvm) should be 1.5 V rms. The corresponding audio voltage at the emitter of Q309 (the emitter follower) should measure around 0.53 V rms.

These ac and rf voltage measurements coupled with the dc voltages listed on the schematic

should make troubleshooting this section of the receiver relatively simple. It is possible for the voltage on the base of the 1st 455 kHz limiter (Q304) to be much lower than indicated and still maintain the correct voltage levels at the remaining points. This is an indication of loss of gain in the lower level stages (refer to paragraph g.).

i. Receiver Audio Circuit

Checking the receiver audio section can be done by measuring noise voltages only (i.e., no carrier signal). Set the VOLUME control to maximum and the SQUELCH control fully counterclockwise (unsquelched). On "Private-Line" tone-coded squelch models, disable PL operation.

Connect an ac voltmeter across the speaker and measure the noise output. At least 3.0 V rms of noise should be measured. (This should correlate to over 5 watts or 4.0 volts of audio output when the unit is receiving a carrier with the standard test modulation.) If the audio output is low, measure the noise voltages at the individual stages to isolate the problem. Typical values of audio noise voltage measured with the Motorola AC Voltmeter are given in TABLE VII.

j. Carrier Squelch Circuit

Remove the carrier signal from the antenna input to the unit. If a "Private-Line" tone-coded squelch model is being checked, disable PL operation (checks for "Private-Line" tone-coded squelch circuits are given in the "Private-Line" section). On all sets, set the SQUELCH control fully clockwise to fully squelch the receiver. Typical meter readings are given in TABLE VIII.

Check the dc voltages at the base and emitter of the 1st audio amplifier Q340. Whether this transistor is forward or reverse biased determines the squelch condition of the receiver. When sufficient noise is present, and the radio is fully squelched, as with no carrier, the voltage applied to the emitter of Q340 should be approximately 8.1 volts dc. The voltage should be increased to 10.0 volts dc to unsquelch the radio circuit.

A properly operating squelch circuit should meet the following sensitivity specifications.

(1) Squelch threshold sensitivity: 0.25 uV (0.15 uV with preamplifier) or less. With no signal input, set the SQUELCH control so the noise just quiets (squelch threshold). On "Private-Line" tone-coded squelch models, take the radio out of the PL mode.

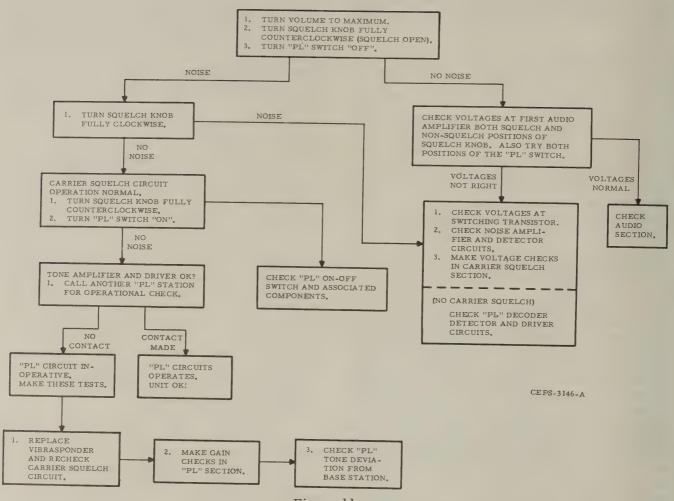


Figure 11.

Receiver "Private-Line" Tone-Coded Squelch Troubleshooting
Chart

switch to OFF. Modulate the signal generator with 1000 Hz tone for 3.0 kHz deviation. Set the signal generator output to zero and increase until the tone is heard in the speaker. No more than 0.25 uV should be required to cause the tone.

(2) Full squelch sensitivity: 0.60 uV or less (0.30 uV with preamplifier). Set the SQUELCH control fully clockwise and apply an input signal as in step (1), preceding. No more than 0.60 uV should be required to produce the tone.

k. "Private-Line" Decoder

A general check of the "Private-Line" circuit performance may be conducted as follows:

(1) Receiver PL squelch sensitivity should be 0.25 uV (0.15 uV with preamplifier) or less. Place the radio in the PL mode. Turn the SQUELCH control

fully counterclockwise. Modulate the signal generator with the "Private-Line" tone frequency stamped on the "Vibrasponder" Resonant Reed of the radio set. (This should be done with the Motorola SLN6221A "PL" Tone Generator to insure that the signal is modulated with the exact PL frequency.) Adjust the modulating tone for 0.5 kHz deviation. Set the signal generator output to zero and increase until noise is heard in speaker. No more than 0.25 uV should be required.

If "Private-Line" squelch sensitivity in the receiver is low or the circuit is inoperative, use TABLE II and the troubleshooting chart (Figure 11) to localize the trouble area.

(2) There should be no "squelchtail" (noise burst) at the end of a transmission from other stations in the communications system. A "squelch tail" is indicative of improper operation of the

transmitter PL delay circuitry. Refer to the section on transmitter servicing.

4. "DIGITAL PRIVATE-LINE" CIRCUIT SERVICING

a. General

All theory of operation, test voltages, waveforms, and other servicing information for the "Digital Private-Line" encoder-decoder is included on the schematic diagram. The "Digital Private-Line" encoder-decoder uses a CMOS integrated circuit. CMOS devices should be handled with care. The precautions described in this section should be read carefully before servicing the "Digital Private-Line" encoder-decoder.

b. Handling Precautions for CMOS Integrated Circuits

Many of the integrated circuit devices used in communications equipment are of the CMOS (Complementary Metal Oxide Semiconductor) type. Because of their high open circuit impedance, CMOS ICs are vulnerable to damage from static charges. Care must be taken in handling, shipping, and servicing them and the assemblies in which they are used.

Even though protection devices are provided in CMOS IC inputs, the protection is effective only against overvoltage in the hundreds of volts range such as are encountered in an operating system. In a system, circuit elements distribute static charges and load the CMOS circuits, decreasing the chance of damage. However, CMOS circuits can be damaged by improper handling of the modules even in a system.

TO AVOID DAMAGE TO CIRCUITS, OB-SERVE THE FOLLOWING HANDLING, SHIP-PING, AND SERVICING PRECAUTIONS:

- (1) Prior to and while servicing a circuit module, particularly after moving within the service area, momentarily touch both hands to a bare metal earth grounded surface. This will discharge any static charge which may have accumulated on the person doing the servicing.
- (2) Whenever possible avoid touching any electrically conductive parts of the circuit module with your hands.
- (3) When servicing a circuit module, avoid carpeted areas, dry environments, and certain

types of clothing (silk, nylon, etc.) because they contribute to static buildup.

- (4) All electrically powered test equipment should be grounded. Apply the ground lead from the test equipment to the circuit module before connecting the test probe. Similarly, disconnect the test probe prior to removing the ground lead.
- (5) If a circuit module is removed from a system, it is desirable to lay it on a conductive surface (such as a sheet of aluminum foil) which is connected to ground through a resistance of approximately 100k.

WARNING

If the aluminum foil is connected directly to ground, be cautious of possible electrical shock from contacting the foil at the same time as other electrical circuits.

- (6) When soldering, be sure the soldering iron is grounded.
- (7) Prior to connecting jumpers, replacing circuit components, or touching CMOS pins (if this becomes necessary in the replacement of an integrated circuit device), be sure to discharge any static buildup as described in procedure 1. Since voltage differences can exist across the human body, it is recommended that only one hand be used if it is necessary to touch pins on the CMOS device and associated board wiring.
- (8) When replacing a CMOS integrated circuit device, leave the device in its metal rail container or conductive foam until it is to be inserted into the printed circuit module.
- (9) All low impedance test equipment (such as pulse generators, etc.) should be connected to CMOS device inputs after power is applied to the CMOS circuitry. Similarly, such low impedance equipment should be disconnected before power is turned off.
- (10) Replacement modules shipped separately from the factory will be packaged in a conductive material. Any modules being transported from one area to another should be wrapped in a similar material (aluminum foil may be used). NEVER USE NONCONDUCTIVE MATERIAL for packaging these modules.

c. Performance Tests

If the decoder is operating properly, a 0.25 microvolt rf carrier modulated ±0.5 kHz with the appropriate digital PL code should unsquelch the receiver. This can be checked as follows:

- (1) Connect the rf signal generator output to the radio set antenna jack and set the generator output level to minimum.
- (2) Modulate the signal generator ±0.5 kHz with the appropriate "DPL" ("Digital Private-Line") code. The modulating signal can be obtained from a Motorola Model S6413A "Digital Private-Line" Test Set.
- (3) Also modulate the signal generator with a 300 to 3000 Hz tone. Total deviation should be ±4 kHz, including "DPL" code.
- (4) Increase the signal generator output level until the receiver unsquelches. No more than 0.25 uV should be needed to unsquelch the receiver.

The encoder should modulate the transmitter rf carrier at least ±0.5 kHz. The transmitted signal should unsquelch any properly-operating receiver that is equipped with the same "DPL"

code and is operating in the "DPL" mode. After the microphone PTT button is released, the transmitter should remain keyed for about 180 milliseconds and the encoder should produce a turn-off code. No squelch tails should be heard in properly-operating "DPL" receivers. Validity of the "DPL" code and turn-off code can be checked with a Motorola S6413A "Digital Private-Line" Test Set.

d. Troubleshooting

If the encoder-decoder performance is unsatisfactory, first thoroughly inspect the radio set and, particularly, the "DPL" encoder-decoder board. Check for visible defects in circuit boards, components and wiring. After any visible defects have been corrected, test the radio set and "DPL" board operation again. If performance is still unsatisfactory, use the following troubleshooting chart to help you isolate the defective circuit and component.

"DIGITAL PRIVATE-LINE" ENCODER-DECODER TROUBLESHOOTING CHART

Use this troubleshooting chart as a supplement to

the maintenance information on the schematic diagram.

the H	namenance information of	on the schematic diagram.
SYMPTOM	PROBABLE CAUSE	CIRCUIT CHECKS
Transmitter has no power output. Transmit relay doesn't operate.	No A+ from PTT delay circuit.	1. Check PTT switch circuit. 2. Check PTT delay circuit.
Transmitter causes squelch tails in "DPL"-equipped receivers.	Turn-off code not being sent, or is of insuf-ficient duration or deviation.	 Check turn-off code deviation: should be ±500 to ±1000 Hz. Turn-off code should begin as soon as PTT button is released. Transmitter should remain keyed for 160 to 250 msec after PTT button is released. Check PTT delay circuit. Check U801-9: should be 0 V during delayed PTT. Check Q821: must be off for proper low-pass filter operation during transmit.
Transmitter cannot un- squelch "DPL"-equipped	Insufficient transmitter "DPL" deviation.	Check "DPL" deviation: should be ±500 to ±1000 Hz.
receivers.	Incorrect or faulty "DPL" code.	 Check U801-15 through U801-23 for proper octal code. Check U801-9: should be +6 V (high).
	Encoder filter is mal-	Check encoder filter (Q801-803 and Q821) for
	functioning. 50 kHz oscillator is	proper operation.
	malfunctioning.	Check U801-4 for 50 kHz square wave. Rise time should be 750 nsec or less.
Receiver will not unsquelch in "DPL" operation.	Switch interface circuits are malfunctioning.	Check switch interface circuits (Q805 and Q806). Q806 emitter should be 12.8 V when U801-7 is high.
	U801 is not decoding properly.	1. Check U801-7: should be 6 V when decoding a valid code.
		Check U801-1: should be 0 V.Check U801-12 with oscilloscope. You
		should see 6 V p-p pulses 1.84 msec apart.

"DIGITAL PRIVATE-LINE" ENCODER-DECODER TROUBLESHOOTING CHART (Cont'd.)

SYMPTOM PROBABLE CAUSE		CIRCUIT CHECKS
	50 kHz oscillator mal- functioning.	Check U801-4 for 50 kHz square wave. Rise time should be 750 nsec or less.
	U801 is not properly	Check U801-15 through U801-23 for proper
	programmed.	octal code.
	U801 is in encode mode.	
	Decoder filter and data	Compare waveforms and voltages with those on
	conditioner malfunc-	the schematic diagram.
Every decades foliais	tioning.	Ch1 11 Cit
Excessive decoder falsing.	Decoder low-pass filter malfunctioning.	Check decoder filter response. At Q812 emitter
	manunctioning.	the filter response should be -1 to -4 dB at
		134 Hz and -12 to -15 dB at 250 Hz. Keep input
		signal below 400 mV p-p to keep CR803 and
	Encoder-decoder U801	CR804 out of clip. Check U801-7: should be low when no code is
	malfunctioning.	decoded.
	U803C in current source	
		is low.
Excessive blocking.	Decoder filter malfunc-	Check decoder filter response. See checks for
Excessive blocking.	tioning.	excessive decoder falsing.
	Current source mal-	Check U803-9: should be 0.1 V when U801-7 is
	functioning.	high.
Squelch open at all times	Switch interface circuit	Check switch interface circuits (Q805 & Q806).
in "DPL".	malfunctioning.	
	U801 malfunctioning.	Check U801-7: should be 6 V except when valid
		code is decoded.
	Power supply voltage is	Check voltage at U801-24.
	not 6.2 V ±.5 V.	
	50 kHz oscillator oper-	Check 50 kHz clock signal at U801-4: should be
	ating intermittently or	50 kHz square wave. Rise time should be
	at wrong frequency.	750 nsec or less.

5. MULTIPLE FREQUENCY MODIFICATION CONNECTIONS

The MULTIPLE FREQUENCY RADIOS
JUMPER AND COMPONENT CONNECTIONS
TABLE lists the standard and optional transmit
(C) and receive (R) combinations. Radio sets
ordered with non-standard combinations are modified as necessary at the factory. New system
requirements for different transmit-receive combinations are easily handled by field modification.

The table lists the frequency combination in the first column. The other columns on the same line indicate which resistors are removed to disable unused oscillators. Jumper columns indicate diodes to be jumpered to ground (for single-frequency operation) or diodes to be jumpered together. Jumpered diodes provide a ground path for the unused oscillator's control leads to activate a desired oscillator. Refer to the transmitter and receiver circuit board detail for component locations.

6. FRONT PANEL AND KEY LOCK REMOVAL

The radio set is completely accessible for service without removing the front panel. Unusual circumstances, such as front panel damage, may necessitate front panel replacement.

To remove the front panel, the key lock must be dismantled, the escutcheon removed and the four front panel screws must be removed. The escutcheon may be glued to the front panel so use care during its removal to prevent buckling. A special tool, Motorola Part No. 66A84909B01, is required to free the lock barrel from the outside housing which in turn permits the locking bar to be removed. Refer to the heatsink and housing detail in the rear of this instruction manual before attempting to remove the lock barrel.

The lock barrel is removed as follows:

(1) Insert the key into the lock and turn the key horizontally to the unlocked position.

- (2) Insert tool (No. 66A84909B01), with the beveled edge of the tool facing upward, into the small slot in the front end of the lock.
- (3) Push the tool in until it stops and turn 180° clockwise.
- (4) Pull the key, this removes the key and the barrel from the lock housing.
- (5) If the lock has a metal locking bar, remove the locking bar spring. Plastic lock bars do not require springs.
 - (6) Remove the lock bar.

Re-assembling the front panel and key lock is accomplished by reversing the order of the steps.

DESIRED FREQUENCY COMBINATION	2-FREQ. CONTROL HEAD (NOTE 2)	4-FREQ. CONTROL HEAD' (NOTE 2)	WHEN	T & RECEIVE OS CONTROL HEAD N THE POSITION POSITION 2	FREQUENCY SW	
C1-R1	X		T1/R1	T2/R2		
CI-R1		X	T1/R1	T2/R2	T3/R3	T4/R4
C1-R2	X		71/R1	T1/R2		
C1-R2		X	T1/R1	T1/R2	T1/R3	T1/R4
C1-R3		X	T1/R1	T1/R2	T1/R3	T1/R4
C1-R4		X	T1/R1	T1/R2	T1/R3	T1/R4
C2-R1	X		. T1/R1	T2/R1		
C2-R1		X	T1/R1	T2/R1	T3/R1	T4/R1
C2-R2	X		T1/R1	T2/R2		
C2-R2		X	T1/R1	T2/R2	T3/R3	T4/R4
C2-R3		X	T1/R1	T2/R2	T2/R3	T2/R4
C2-R4		X	T1/R1	12/R2	T2/R3	T2/R4
C3-R1		X	T1/R1	T2/R1	T3/R1	T4/R1
C3-R2		X	T1/R1	T2/R2	T3/R2	T4/R2
C3-R3		X	T1/R1	T2/R2	T3/R3	T4/R4
C3-R4		X	T1/R1	T2/R2	T3/R3	T3/R4
C4-R1		X	T1/R1	72/R1	T3/R1	T4/R1
C4-R2		X	T1/R1	T2/R2	T3/R2	T4/R2
C4-R3		X	TI/RI	T2/R2	T3/R3	T4/R3
C4-R4		X	T1/R1	T2/R2	T3/R3	T4/R4

- NOTES: 1. INSTA
- 2. MODIE
- BEING 3. TO MC WIRES

EPS-3594-A

- (2) Insert tool (No. 66A84909B01), with the beveled edge of the tool facing upward, into the small slot in the front end of the lock.
- (3) Push the tool in until it stops and turn $180\,^{\circ}$ clockwise.
- (4) Pull the key, this removes the key and the barrel from the lock housing.
- (5) If the lock has a metal locking bar, remove the locking bar spring. Plastic lock bars do not require springs.
 - (6) Remove the lock bar.

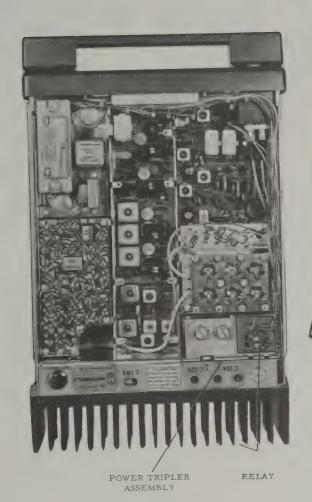
Re-assembling the front panel and key lock is accomplished by reversing the order of the steps.

MULTIPLE FREQUENCY RADIO SETS JUMPER AND COMPONENT CONNECTIONS TABLE

DESIR ED	2-FREQ. CONTROL	4-FREQ. CONTROL		TR	ANSMITT	ER OSCI	LLATOR	MODIFIC	CATIONS			RECEIVE	CR OSCILL	ATOR MO	LATOR MODIFICATIONS RECEIVER OSCILLATOR MODIFICATIONS					CTIVATED
FREQUENCY COMBINATION	HEAD HEAD MODIFICATION	REMOVE THE INDICATED RESISTORS			DIODE	JUMPER THE INDICATED DIODE ANODES TOGETHER		R.	REMOVE THE INDICATED RESISTORS		JUI	APER TH	E INDICATED	WHEN	WHEN CONTROL HEAD FREQUENCY SWITCH IS IN THE POSITION INDICATED					
	1	(NOTE 2)	REQUIRED	R466	R473	R480	CR101	CR461	CR463	CR465	R432	R435	R438	CR40	CR430	CR431 CR4		POSITION 2	POSITION 3	POSITION 4
C1-R1	X				X	X						X	X				T1/R1	T2/R2		
Cl'-Rl		X	X														T1/R1	T2/R2	T3/R3	T4/R4
C1-R2	X			X	X	X	Note 1					Х	X				11/R1	T1/R2		
C1-R2		X		X	Х	Х	Note 1										T1/R1	T1/R2	T1/R3	T1/R4
C1-R3		X		X	X	X	Note 1										T1/R1	T1/R2	T1/R3	T1/R4
Cl-R4		X		X	X	X	Note 1										11/R1	T1/R2	T1/R3	T1/R4
C2-R1	X				X	X					X	X	X	Note 1			T1/R1	T2/R1		1
C2-R1		X									X	X	X	Note 1			T1/R1	T2/R1	T3/R1	T4/R1
C2-R2	X				X	X						X	X				T1/R1	T2/R2	13/11	11/1(1
C2-R2		X	X											-			T1/R1	T2./R2	T3/R3	T4/R4
C2-R3		X			X	X											T1/R1	T2/R2 ·	T2/R3	T2/R4
C2-R4		X			X	X							-				T1/R1	TZ/RZ	T2/R3	T2/R4
C3-R1		X									X	X	X	Note 1			T1/R1	T2/R1	T3/R1	T4/R1
C3-R2		X										X	X	1,0101				T2/R2	T3/R2	T4/R2
C3-R3		X	X		1				,			21	21				T1/R1	T2/R2	T3/R3	T4/R4
C3-R4		X		1		X			•					-			T1/R1	T2/R2	T3/R3	T3/R4
C4-R1		X				1					X	X	X	Note l			T1/R1	T2/R2	T3/R3	T4/R1
C4-R2		X									^	X	X	Note1				T2/R1	T3/R1	
C4-R2		X										^	-							T4/R2
												-	X				T1/R1	T2/R2	T3/R3	T4/R3
C4-R4		X	X														T1/R1	T2/R2	T3/R3	T4/R4

- 1. INSTALL A JUMPER FROM THE ANODES OF THE INDICATED DIODE TO GROUND.
 2. MODIFICATION REQUIRED DIFFER DEPENDING ON WHETHER A TWO-FREQUENCY OR FOUR-FREQUENCY CONTROL HEAD IS BEING USED.
- 3. TO MODIFY A MULTI-FREQUENCY RADIO FOR C1-R1 OPERATION WITH A SINGLE FREQUENCY CONTROL HEAD, PLACE JUMPER WIRES FROM THE ANODES OF CR101 AND CR40 TO GROUND. PLACE THE CRYSTALS IN OSCILLATORS T1 AND R1.

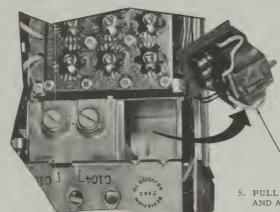
EPS-3594-A



ASSEMBLY

THERMOCOUPLE 1. REMOVE SCREW HOLDING THERMOCOUPLE ASSEMBLY

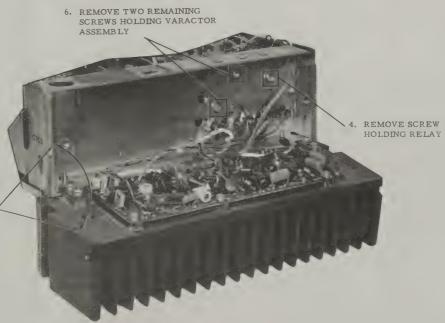
> 2. MOVE THERMOCOUPLE ASSEMBLY AWAY FROM VARACTOR ASSEMBLY



5. PULL RELAY UP, OUT AND AWAY FROM ASSEMBLY

7. LIFT POWER
TRIPLER UP AND
AWAY FROM RADIO SET FOR SERVICING.





DEPS-4786-O

3. FOLD OUT POWER AMPLIFIER ASSEMBLY

Figure 12. Power Tripler Removal

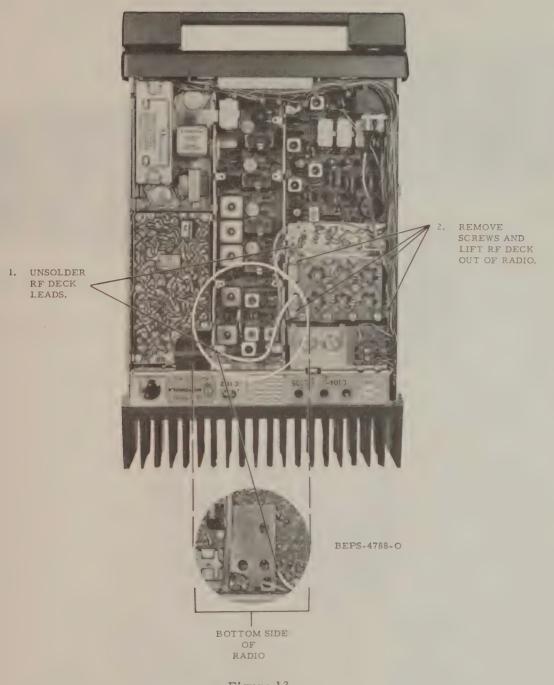
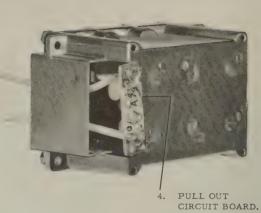


Figure 13 RF Deck Removal



REMOVE SCREW AND TAKE OFF PLATE.



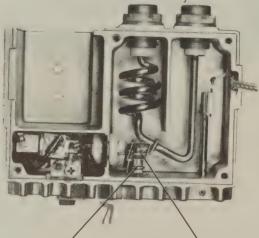
3. UNSOLDER LEADS -



REMOVE THREADED STAND-OFFS.

BEPS-4789-O

Figure 14. RF Deck Disassembly



VARACTOR

HEAT TOP OF VARACTOR WITH SOLDERING IRON. WHEN SOLDER FLOWS FREELY, UNSCREW VARACTOR BUSHING FROM HOUSING.

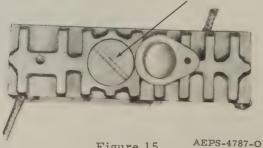
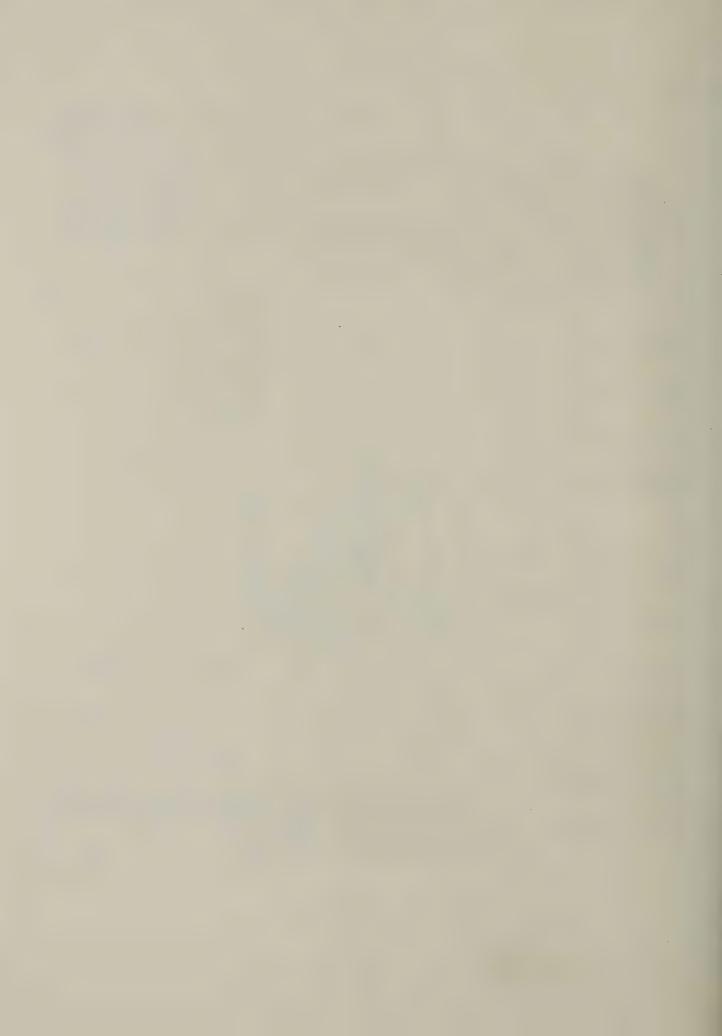


Figure 15. AEPS-47
Varactor Diode Removal

TABLE OF RECOMMENDED TEST EQUIPMENT

TYPE OF EQUIPMENT OR TYPE OF MEASUREMENT	EQUIPMENT CHARACTERISTICS	RECOMMENDED TYPE		
A11	Select battery operated test equipment, where available, for versatility. Battery operated equipment permits testing in the vehicle or on the bench.	See your Motorola sales representative before ordering test equipment. He will analyze your requirements and help you select the latest available equipment to suit your individual needs. He can also advise you of new servicing equipment which becomes available after the printing of this manual.		
Power supply for bench testing	Capability: 13.6 V @ 15 amp	Motorola Model S1346A Regulated Power Supply, or Motorola T1012A Power Supply with Motorola TEK-15A Ripple Filter.		
Test harness for bench testing	Must simulate conditions of installation in vehicle including fusing, volume and squelch controls, frequency selection, speaker loading.	"Mocom · 70" cables, control head, microphone and speaker, or Motorola TEK-25 or TEK-29 Universal Control Panel with TEKA-48 Accessory Power & Control Cable.		
Portable test set	No equivalent. Use only recommended type.	Motorola S1056B to S1059B Series Port- able Test Set with Motorola Model SKN6012B Metering Cable		
Transmitter frequency measurement	Frequency - 50-500 MHz Accuracy - ±.00005% or better	Any of the following items of Motorola test equipment: Model S1343/1344 Series Digital Frequency/Deviation Meter Model S1315A Frequency Calibrator Model S1343 Series Digital Frequency/Period Counter		
Transmitter deviation measurement	Peak reading type for voice or sinusoidal wave; scales for accurate reading of ±5 kHz deviation (and ±1 kHz deviation for "Private-Line" models).	Motorola Model S1059B Portable Test Set, or Motorola S1344 Series Digital Frequency/Deviation Meter		
Transmitter power output measurement	450-512 MHz; 50 ohms; at least 0-50 watt capability	Use any of the following: Model T1005A "Termaline" Wattmeter Model T1007A "Termaline" Wattmeter Model T1001A "Thruline" Wattmeter with T1013A Load Resistor		
RF Signal generator for receiver testing Audio voltage	450-512 MHz; FM; high stability - (±0.001% or better); adjustable output 0 to 100 millivolts High impedance (10 megohm); dBm scale	Metorola S1341A or S1342A Series Solid- State FM Signal Generator Motorola Solid-State AC Voltmeter		
measurements Audio signal generator for audio circuit testing in re- ceiver and transmitter	Variable amplitude 0 to 1 volt; 1000 Hz tone (300 to 3000 Hz preferred); sinusoidal wave.	Motorola Model S1067A Solid-State Audio Oscillator or Model TEK-lB Tone Oscillator		
DC voltage measurements, resistance measurements, rf voltage measurements.	High impédance (l1 megohm) dc multimeter.	Motorola Solid-State DC Multimeter with rf probe.		
Waveform measurements	Oscilloscope: Audio circuit measurements	D61, D66 or D67 Telequipment Dual Trace Oscilloscope		
"Private-Line" tone injection for PL decoder circuit measurements	"Private-Line" tone generator using "Vibra- sender" resonant reed for frequency accuracy; or audio oscillator with frequency counter for accurate setting of oscillator.	Motorola Model SLN6221A "Private- Line" Tone Generator		

EPS-4791-G



	15	to all radios.		
			METER	
		ADJUSTMENT	READING	PROCEDURE
CC	Regu			Key transmitter.
	Radio ^s cial r The r	L102, L103	PEAK	Tune the oscillator output coils L102 and L103, in that order, for a peak reading in position 3. For multi-frequency radios, make all tuning adjustments on the lowest transmitter frequency.
	techni Frequ check			Tune L104 for a PEAK indication on meter 5 if possible. If position 5 does not read, tune L104 for a minimum reading in meter position 3.
	Trans	L105, L106	PEAK	Tune the tripler output coils L105 & L106, in that order, for a peak reading in position 5.
	specif that t	C101	PEAK	Tune the 1st amplifier output trimmer capacitor, C101, for a peak reading in position 5.
	Trans	L102, L103, L104, L105, L106, C101	PEAK	Repeat step 3. Tune L104 for a peak indication on position 5. Repeat steps 5 and 6.
	power height	R105		Set the power output control, R105 fully counter- clockwise for maximum power output.
	ERP power	ain only to 450-47	0 MHz radi	os.
	I	C105, C104, C103, C102	PEAK	Be sure R105 is set per step 8. Tune C105, C104, C103, and C102, in that order for max. power output.
1.	Moto Cabl	C101	PEAK	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5.
	if a t	C105, C104, C103, C102	PEAK	Repeat step 9.
2.	Moto	tain only to 470-5	12 MHz rad	ios.
 4. 5. 7. 	Moto Moto Moto Moto Moto	R105, C103, C105 C104, C102	PEAK	Be sure R105 is set per step 8. Tune C103, C105, C10-C103 again, and C102, in that order, for max. power output. IMPORTANT Two peaks may be observed when tuning C104. Tune to the peak nearest maximum
	Line and	C 101	PEAK	Clockwise rotation (maximum capacitance). Tune 1st amplifier output trimmer, C101, for a peak reading in position 5.
		R105, C103, C105, C104, C102	PEAK	Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation.
		_		ters only (i.e., multi-frequency transmitters not exceeding 5.5 MHz).
		R105		Set the power output control R105 fully clockwise.
		L102	Equal readings on f high & f low	Alternately switch between the highest and lowest transmit frequencies and adjust L102 for equal readings on meter 3.
		L105	Fqual readings	Alternately switch between the highest & lowest transmit frequencies and adjust L105 for equal

Transmitter Alignment Procedure Motorola No. PEPS-4873-E 8/20/75-PO

readings
on f
high
& f
low

readings on meter 5.



TRANSMITTER PRE-ALIGNMENT NOTES

A. EXCERPTS FROM FCC REGULATIONS

FCC Regulations state that:

- .. Radio transmitters may be tuned or adjusted only by persons holding a 1st or 2nd class commercial radiotelephone operator's license or by personnel working under their immediate supervision.
- The rf power output of a radio transmitter shall be no more than that required for satisfactory technical operation considering the area to be covered and the local conditions.
- Frequency and deviation of a transmitter must be checked before it is placed in service and rechecked once each year thereafter.

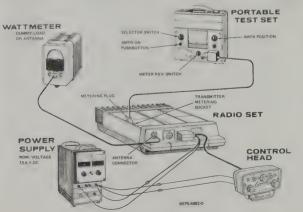
NOTE

Transmitters operating in the 450-470 MHz band are licensed to operate at or below a specified input power to the final amplifier. Use of this alignment procedure assures that this level will not be exceeded.

Transmitters operating in the 470-512 MHz band are licensed to operate at or below a specified effective radiated power (ERP). The ERP of a radio is dependent upon rf power output of the radio, antenna transmission line loss, antenna gain and antenna height. The rf power output for various ERP values of this radio are given in the ERP TABLE on the reverse side of this alignment procedure. Do not exceed the rf power output value specified.

B. TEST EQUIPMENT REQUIRED

- .. Motorola S1056B to S1059B Series Portable Test Set with a Motorola Model SKN6012B Metering Cable. A 0-50 microampere meter with 20,000 ohms equivalent series resistance may be used if a test set is not available. A modified Motorola S1327A or S1327B Monitor or equivalent must be used for "Digital Private-Line" deviation measurements.
- 2. Motorola TLN4474A Alignment Tool Kit supplied with radio.
- 3. Motorola Model T1005A "Termaline" Wattmeter or equivalent.
- 4. Motorola Model S1346A DC Power Supply or equivalent.
- Motorola Model S1067A Audio Oscillator or equivalent.
- b. Motorola Model S1344 Series Digital Frequency Meter/Deviation Calibrator.
- 7. Motorola Model S1053C Solid-State AC Voltmeter or equivalent.



Test Equipment Set-Up

C. HOW TO SET UP THE S1056A-9A PORTABLE TEST SET

- 1. Set function selector switch to XMTR position.
- 2. Place the oscillator and meter reversing switch in the OFF position.
- 3. Connect the 20-pin meter cable plug to the test set; connect the other end of the cable to the transmitter metering socket. When the test set is not being used, disconnect the 20-pin metering cable to conserve internal battery life. The plug on the cable acts as an on-off switch completing the battery circuit.

D. HOW TO KEY THE TRANSMITTER

- 1. Connect the rf wattmeter to the front panel antenna receptacle.
- Key the transmitter with XMTR-ON switch on the test set or with a microphone plugged into the test set or radio set control head.

AUTION

Do not key the transmitter for more than a few seconds at a time until it is properly tuned. Turn on the transmitter for brief periods while reading the meterand making the adjustments.

E. FREQUENCY CALCULATIONS

FREQUENCY	(MHz)	CALCULATION
450-512		f - f c 27

Where f = crystal frequency, f = carrier frequency

F. TEST SET SELECTOR SWITCH POSITIONS

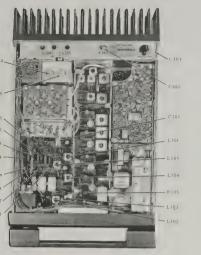
TEST SET CIRCUIT	Base of Buffer	Output of 1st	Final Amplifier
S1056A-9A SERIES	3	5	7



SPANNER WRENCH



Alignment Tool



AEPS-4871-O

Transmitter Adjustment Locations

G. TRANSMITTER ADJUSTMENT

Steps		to all radios.		
STEP	TEST SET SWITCH POSITION	ADJUSTMENT	METER READING	PROCEDURE
1		L101, L107, L108, L109, L102, L103, L104, L105, L106, C101, C102, C103, C104, C105, R105		This step is required only if the controls have been drastically misaligned, or if the transmitter frequency is being changed. If necessary, pre-position transmitter coil slugs L101, L107, L108, L109, L102, L104 and L105 to top of coil forms (i.e., the end of form farthest from circuit board). Pre-position coil slugs L103 10-1/2 turns from top of coil form and L106 15-turns from top of coil form and L106 15-turns from top of coil form. Set lst amplifier trimmer capacitor (C101) 1/2-turn from fully clockwise position. Set power amplifier interstage capacitor (C102) fully clockwise. Set power amplifier output capacitor (C103) 1-turn from the fully clockwise position. Turn power tripler tuning screws (C104, C105) clockwise until they "bottom out". DO NOT FORCE. For 450-470 MHz radios only, turn C104 and C105 two complete turns counterclockwise from the full clockwise position. For all radios, turn power control (R105) fully clockwise (minimum power output position).

G. TRANSMITTER ADJUSTMENT (CONT'D) teps 1 thru 8 apply to all radios.

SWITCH

TEP POSITION | ADJUSTMENT READING

2				
				Key transmitter.
3	5	L102, L103	PEAK	Tune the oscillator output coils L102 and L103, in
	ì			that order, for a peak reading in position 3. For
				multi-frequency radios, make all tuning adjust-
				ments on the lowest transmitter frequency.
4	3 or 5	L104		Tune L104 for a PEAK indication on meter 5 if
				possible. If position 5 does not read, tune L104
				for a minimum reading in meter position 3.
5	5	L105, L106	PEAK	Tune the tripler output coils L105 & L106, in that
				order, for a peak reading in position 5.
6	5	C101	PEAK	Tune the 1st amplifier output trimmer capacitor,
				C101, for a peak reading in position 5.
7	5	L102, L103,	PEAK	Repeat step 3. Tune L104 for a peak indication or
		L104, L105,		position 5. Repeat steps 5 and 6.
	ļ	L106, C101		
8	Wattmeter	R105		Set the power output control, R105 fully counter-
				clockwise for maximum power output.
Steps	9 thru 11 per	tain only to 450-47	0 MHz radi	ios.
9	Wattmeter	C105, C104,	PEAK	Be sure R105 is set per step8. Tune C105, C104,
	***************************************	C103, C102	* 174 177	C103, and C102, in that order for max. power output.
10	5	C101	PEAK	Tune 1st amplifier output trimmer, C101, for a
		0.101	1 227515	peak reading in position 5.
11	Wattmeter	C105, C104,	PEAK	Repeat step 9.
		C103, C102		Acpear step /:
C4	12 41 14		2 3 62 7	
Steps	12 thru 14 pe:	rtain only to 470-51	Z MHZ Fac	1108.
12	Wattmeter	R105, C103, C105	PEAK	Be sure R105 is set per step 8. Tune C103, C105, C10-
		C104, C102		C103 again, and C102, in that order, for max. power
				output. IMPOF. ANI
				Two peaks may be observed when tuning
				C104. Tune to the peak nearest maximum clockwise rotation (maximum capacitance).
13				
		C 101	DEAK	
	5	C101	PEAK	Tune 1st amplifier output trimmer, C101, for a
1.4				Tune 1st amplifier output trimmer, C101, for a peak reading in position 5.
14	Wattmeter	R105, C103,	PEAK	Tune 1st amplifier output trimmer, Clo1, for a peak reading in position 5. Tune Clo3, Clo5, Clo4, Clo3 again, and Clo2,
14		R105, C103, C105, C104,		Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two
14		R105, C103,		Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to
	Wattmeter	R105, C103, C105, C104, C102	PEAK	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation.
Steps	Wattmeter	R105, C103, C105, C104, C102	PEAK	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters
Steps	Wattmeter	R105, C103, C105, C104, C102	PEAK	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation.
Steps with c	Wattmeter	R105, C103, C105, C104, C102	PEAK	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters
Steps with c	Wattmeter	R105, C103, C105, C104, C102	PEAK	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5.5 MHz).
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1	PEAK d transmit .0 MHz bu Equal readings	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5.5 MHz). Set the power output control R105 fully clockwise.
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1	PEAK d transmit , 0 M Hz bu Equal readings	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5.5 MHz). Set the power output control R105 fully clockwise. Alternately switch between the highest and lowest transmit frequencies and adjust L102 for equal
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1	PEAK d transmit , 0 M Hz bu Equal readings	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5.5 MHz). Set the power output control R105 fully clockwise. Alternately switch between the highest and lowest
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1 R105 L102	PEAK d transmit .0 MHz bu Equal readings on f high & flow	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5.5 MHz). Set the power output control R105 fully clockwise, Alternately switch between the highest and lowest transmit frequencies and adjust L102 for equal readings on meter 3.
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1	PEAK d transmit .0 M Hz bu Equal readings on f high & f low Equal	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5,5 MHz). Set the power output control R105 fully clockwise. Alternately switch between the highest and lowest transmit frequencies and adjust L102 for equal readings on meter 3. Alternately switch between the highest & lowest
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1 R105 L102	PEAK d transmit .0 M Hz bu Equal readings on f high low Equal readings	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5.5 MHz). Set the power output control R105 fully clockwise. Alternately switch between the highest and lowest transmit frequencies and adjust L102 for equal readings on meter 3. Alternately switch between the highest & lowest transmit frequencies and adjust L105 for equal
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1 R105 L102	PEAK d transmit .0 M Hz bu Equal readings on f high & f low Equal readings	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If two peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters t not exceeding 5,5 MHz). Set the power output control R105 fully clockwise. Alternately switch between the highest and lowest transmit frequencies and adjust L102 for equal readings on meter 3. Alternately switch between the highest & lowest
Steps with c	Wattmeter 15 thru 20 pe hannel separ:	R105, C103, C105, C104, C102 rtain to wide-space ation in excess of 1 R105 L102	PEAK d transmit .0 M Hz bu Equal readings on f high & f low Equal	Tune 1st amplifier output trimmer, C101, for a peak reading in position 5. Tune C103, C105, C104, C103 again, and C102, in that order, for maximum power output. If twe peaks are observed while tuning C104, tune to the peak nearest maximum clockwise rotation. ters only (i.e., multi-frequency transmitters tnot exceeding 5.5 MHz). Set the power output control R105 fully clockwise Alternately switch between the highest and lowest transmit frequencies and adjust L102 for equal readings on meter 3. Alternately switch between the highest & lowest transmit frequencies and adjust L105 for equal

ALIGNMENT CONTINUED ON REVERSE SIDE

Transmitter Alignment Procedure Motorola No. PEPS-4873-E 8/20/75-PO

G. TRANSMITTER ADJUSTMENT (CONT'D)

STEP	TEST SET SWITCH POSITION	ADJUSTMENT	METER READING	PROCEDURE
18	3, 5	L102, L105	Equal readings on f high low	Repeat steps 16 and 17 until meter 3 and meter 5 readings deviate less than 2 uA when transmitter is switched from highest to lowest frequency.
19	Wattmeter	R 105		Set power output control R105 fully counterclock- wise for maximum power output.
20	Wattmeter	C105	Equal readings on f high low	If power output is not within 2 watts on highest and lowest frequencies, tune output screw of power tripler, C105, for nearly equal power levels.
Steps	21 and 22 app	ly to all radios.		
21	Wattmeter	C104, C105	Equal readings on f high low	Use Spanner Wrench provided in tuning tool kit to tighten locknuts on tuning screws C104 and C105. Use caution to avoid detuning these capacitors. Check power output on all frequencies.
22	7	C103	Not more than 40 uA	Meter position 7 should read less than 40 uA. If necessary, turn C103 counterclockwise until meter 7 reads 40 uA.
Steps 2	23 and 24 peri	tain only to 450-47	0 MHz radi	DS.
23	Wattmeter	R105	30 Watts	Set the power output control, R105, in the following manner. On multi-frequency radios use the transmit channel with the lowest power output. If the rf power output exceeds 30 watts, adjust R105 until power output is reduced to 30 watts. If power output is between 25 watts and 30 watts, increase the dc supply voltage until power output is equal to 31 watts and adjust R105 for 30 watts out.
24			25 Watts minimum	On multi-frequency transmitters, check power output on all channels. If power on any channel is less than 25 watts, use that channel and readjust R105 as per step 23.
Steps	25 and 26 pert	ain only to 470-51	2 MHz radio	DS •
25	Wattmeter	R105		Refer to the model number of the radio and find its listing in the ERP TABLE. Set the power output control R105 for the power output specified in the ERP TABLE.
26	Wattmeter	R105		On multi-frequency models check the power output on all channels. If the power output exceeds that specified in the table, readjust R105 for the specified value.

*ERP TABLE

RADIO MODEL	*ERP	RF POWER OUTPUT	ANTENNA		
KADIO MODEL	WERP RF POWER OUTPUT		470-494 MHz	494-512 MHz	
U24BCA Series T24BCA Series D24BCA Series	10 watts	16 watts	TAE6054A	TAE6055A	
U24BCA Series T24BCA Series D24BCA Series	25 watts	16 watts	TAE6074A	TAE6075A	
U34BCA Series T34BCA Series D34BCA Series	50 watts	22 watts	TAE6064A	TAE6065A	

The FCC restricts transmitters in the 470-512 MHz range to operate at or below a specified ERP. Therefore, the rf power output of the radio should not exceed the values specified in the table.

H. FINAL METER READINGS

- 1. Each time a transmitter is aligned or tested, final meter readings should be made and entered in a logbook.
- 2. All readings given in the following table are minimum (based on a nominal dc supply voltage of 13.6 volts) except M7 (final amplifier current) which is a maximum reading.
- 3. The readings at positions 3 and 5 are purely relative and do not give actual current or voltage measurements.
- 4. Multiply the microampere scale reading obtained in position 7 by 0.2 to determine the actual

EXAMPLE: Meter Reading = 40 uA Multiplying Factor = 0.2 Actual Current = 40 x 0, 2 = 8 amperes

TRANSMITTER METERING TABLE

S1056A-9A SERIES SWITCH POSITION	3	5	7
METER READING	5 uA min (normal tuning) 3 uA min (wide space tuning)	15 uA min (normal tuning) 8 uA min (wide space tuning)	40 uA (max)
CIRCUIT METERED	Oscillator Output	Exciter Output	Final Amplifier Current

I. OSCILLATOR FREQUENCY ADJUSTMENT

Setting the oscillator "on frequency" should be done after the transmitter has been aligned, but before transmitter deviation is checked and set. To set the oscillator on frequency, perform the following steps:

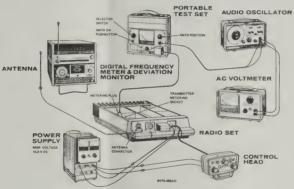
- 1. Set up the frequency meter as described in the frequency meter instruction manual.
- 2. Set the frequency selector switch on the control head to the F1 position (multi-freq. units only).
- 3. Key the transmitter with no modulation using the portable test set. On "Private-Line" tonecoded squelch models, disable the "Private-Line" tone generator by removing the "Vibrasender" resonant reed. On "Digital Private-Line" binary-coded squelch models disable the encoder output by shorting the code disable points located between +6.2 V and the junction of R807 and R808.

- 4. Adjust L101 for proper readings on the frequency meter. If the frequency as indicated on the frequency meter is too low, turn slug of L101 counterclockwise; if too high, turn clockwise.
- 5. Set the frequency selector switch to the F2 position and repeat step 4 using L107.
- 6. Repeat step 5 for F3 and F4 using L108 and L109 respectively,
- 7. On "Private-Line" models, reinsert the "Vibrasender" resonant reed into the tone generator board or disconnect code disabling jumper.

Omit steps 5 and 6 for single-frequency units.

J. "IDC" ADJUSTMENT PROCEDURE

NOTE
The IDC Adjustment must be made after the oscillator frequency adjustment has been made.



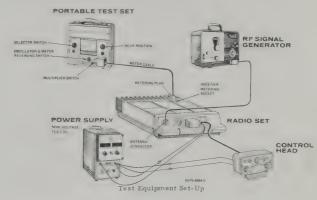
IDC Adjustment Test Equipment Set-Up

- , 1. Insert the "Vibrasender" resonant reed or code plug in "Private-Line" squelch models.
- 2. Connect the output leads of the tone oscillator through a 0.33 uF capacitor to the transmitter audio input (microphone receptacle).
- 3. Connect the ac voltmeter across the same terminals and adjust the tone generator output to l volt
- 4. Place the control head frequency selector switch in the F1 position (in multiple-frequency models) and key the transmitter using the portable test set, Adjust the F1 IDC control, R101, for 5 kHz deviation as read on the deviation measuring instrument used. For multiple frequency models adjust the F2, F3 and F4 IDC controls (R102, R103, and R104 respectively) with the frequency selector switch in the corresponding position.
- 5. Reduce the tone oscillator output to 200 millivolts. Essentially full deviation should still be indicated. Less than full deviation may indicate a weak audio stage or other lack of audio gain.
- 6. Remove the 1000 Hz modulation. "Private-Line" tone deviation should be between 0.5 to 1 kHz. "Digital Private-Line" deviation should be between 0.5 and 1 kHz; see Bl above.

RECEIVER ALIGNMENT PROCEDURE

A. TEST EQUIPMENT REQUIRED

- . Motorola S1056B to S1059B Series Portable Test Set with Motorola Model SKN6012B Metering Cable.
- 2. Motorola Model S1346A Regulated Power Supply (or equivalent).
- . Motorola S1341A or S1342A Series Solid-State FM Signal Generator or equivalent.
- Motorola TLN4474A Alignment Tool Kit (supplied with radio). A small screwdriver may be used for some of the adjustments.



B. HOW TO SET UP THE S1056A-9A PORTABLE TEST SET

- 1. Set function selector switch to RCVR position.
- 2. Switch on 455 kHz crystal oscillator.
- 3. Connect the 20-pin meter cable plug to the test set; connect the adapter cable to the cable coming from the test set; connect the other end of the adapter cable to the receiver metering socket. When the test set is not in use; disconnect the 20-pin metering cable to conserve internal battery life. The plug on the cable acts as an on-off switch completing the battery circuit.
- 4. Connect the rf extension cable to the test set; connect the rf probe cable to the rf extension cable.

C. HOW TO SET UP THE SIGNAL GENERATOR FOR RF ALIGNMENT

- 1. Set up the signal generator according to the instructions supplied with the unit.
- 2. Connect the signal generator cable to the antenna input.
- 3. Turn the generator output up to maximum.
- 4. Keep the test set in position 4.
- 5. Rotate the signal generator dial back and forth near the assigned rf carrier frequency. Watchthe test set meter. The pointer should swing above and below the zero reading as the dial is rotated if the discriminator has been properly aligned. Set the dial for exact zero meter reading. Be sure the generator frequency is kept at zero meter reading.

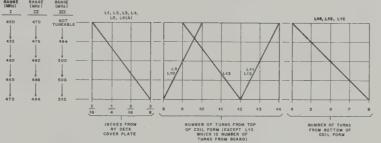
D. TEST SET SELECTOR SWITCH POSITIONS

S1056A-9A TEST SET POSITION	1	3	4	5	6	11
TYPICAL NO SIGNAL READING	0 uA	16 uA	0 uA	25 uA	lb uA	
CIRCUIT METERED	Base of 3rd 455 kHz IF Amplifier	Base of the Multiplier Tripler	Discriminator Zero	3rd 455 kHz Limiter Output	lst Oscillator Activity	Audio Output

E. FREQUENCY CALCULATIONS



F. PRETUNING CHART



G. RECEIVER ALIGNMENT

TERCE CEE

455 kHz DISCRIMINATOR ALIGNMENT

STEP	SWITCH POSITION	ADJUSTMENT	METER READING	PROCEDURE
1		L312 Disc. Primary		Position slug flush with top of coil form.
2		L313 Disc. Secondary		Position slug to bottom of form (next to circuit board).
3	5	Discriminator Primary (Top Slug) L312	PEAK	Inject a strong 455 kHz crystal-controlled signal from portable test set (25 uA minimum in position 1) to the input of the 455 kHz filter (collector of 2nd mixer - Q6). Tune L312 for a peak indication on meter position 5.
4	4	Disc. Secondary (Bottom Slug - nearest to circuit board) L313	ZERO	Tune exactly to zero. DO NOT readjust primary.

G. RECEIVER ALIGNMENT (CONT'D)

FIRST OSCILLATOR MULTIPLIER ALIGNMENT

STEP	TEST SET SWITCH POSITION	ADJUSTMENT	METER READING	PROCEDURE
10	1	L14, L15, L16	PEAK	Set signal generator "on frequency" and tune L14, L15, and L16 for peak indication in position 1. Re duce signal generator level as necessary to main- tain a meter 1 reading of below 30 uA. Repeat the procedures, carefully tuning all coils to a precise peak.

1ST IF AND RF DECK ALIGNMENT

11	1	L1, L2, L3, L4, L5, L6 (A)	PEAK	RF DECK - If the radio is equipped with the optional preamplifier, disconnect and bypass the preamplifier. Tune L1 through L6 (A) in that order for a maximum indication on meter position 1. Reduce generator output level as required to keep meter 1 reading below 30 uA.
12	1	L6 (B), T1, T2 L7, L8	PEĀK	11.7 MHz IF - with rf generator on carrier frequency, tune coils L6 (B), T1, T2, L7 and L8 for a peak indication on meter position 1. Reduce rf generator output as required to maintain meter 1 reading below 30 u.A. (Coils should tune with slugs positioned approximately 4-1/2 turns from top of form. Preposition slugs to facilitate tuning if high i-f has been drastically misalligued.)
13	1	L14, L15, L16, L1, L2, L3, L4, L5, L6 (A)	PEAK	Repeat steps 10 and 11.
14	11 or Audio Voltmeter	L15, L16, L5, L6 (A)	Best Quieting	Reduce the rf generator input to the 20 dB quieting level. Retune L15 and L16 on the injection tripler and L5 and L6 (A) on the rf deck for best quieting.
15*	1	C1, C2	PEAK	RF PREAMPLIFIER - If the radio is equipped with an optional preamplifier, reconnect the preamplifier Tune Cl and C2 for a peak indication on position 1. Reduce generator output level to keep meter 1 read- ing below 30 uA.
16*	11 or Audio Voltmeter	C1, C2, L1, L2	Best Quieting	Reduce the signal generator output to the 20 dB quieting level and repeat Cl and C2 on the preamplifier and L1 and L2 on the rf deck for best quieting sensitivity.

*Skip this step unless the radio set is equipped with an optional RF Preamplifier.

FIRST OSCILLATOR MULTIPLIER ALIGNMENT

Receiver Adjustment Locations

G. RECEIVER ALIGNMENT (CONT'D)
455 kHz DISCRIMINATOR ALIGNMENT

METER

F2 WARP

F3 WARP

STEP POSITION ADJUSTMENT READING

L15, L16

L9, L10, L11

L12, L13, L14,

SWITCH

6	6	L9, L10	PEAK	Tune L9 and L10 for a peak indication on position 6.
7	3	L11, L12, L13	PEAK	Tune Lll, Ll2 and Ll3 for a peak indication on position 3.
8	6, 3	L9, L10, L11, L12, L13	PEAKS	Repeat steps 6 and 7.
9		L1, L2, L3, L4, L5, L6 (A)		This step is required only if these coils have been drastically misaligned or if the receiver frequency is being changed. RF DECK - use a screwdriver to preset the rf deck tuning screws L1 thru L6 (A) by turning the tuning screws counterclockwise (away from the top plate) until screws protrude according to the pretuning chart.

(TOP OF COIL

AEPS-4870-A

PROCEDURE

frequency is being changed. If necessary,

according to the pretuning chart.

This step is required only if these coils have

been drastically misaligned, or if the receiver

preposition the oscillator multiplier coil slugs

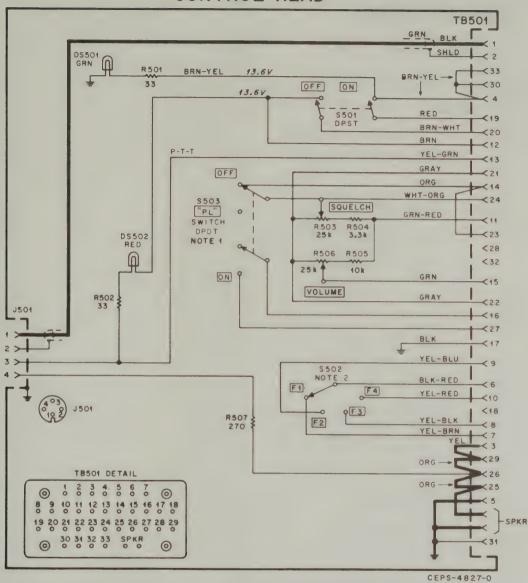
RECEIVER FREQUENCY ADJUSTMENT

17	4	C1 (Freq. #1) C2 (Freq. #2) C3 (Freq. #3) C4 (Freq. #4)	0 uA	With a carrier of known frequency on the air, set the corresponding oscillator warp capacitor to obtain a 0 uA reading in meter position 4.
				If the radio's receiver and transmitter are on the same frequency and if the transmitter is warped "on frequency", then the receiver may be netted to the transmitter by using the built-in netting function. Remove one end of the wire netting jumper, located near L105 in the exciter, from its pin and connect it to the pin located near CR180 in the exciter IDC circuit. This activates the low level exciter stages, which quiets the receiver. Set the corresponding receiver oscillator warp capacitor to obtain a 0 uA reading in meter position 4.

Receiver Alignment Procedure Motorola No. PEPS-4872-D



TRUNK-MOUNT CONTROL HEAD



NOTES

- . S503 AND ASSOCIATED WIRING USED IN "PRIVATE-LINE" MODELS ONLY.
- S502 AND ASSOCIATED WIRING USED IN MULTIPLE FREQUENCY MODELS ONLY.

EPS-4864-0

PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Control Head Used in 1- & 4-Frequency Radio Sets Schematic Diagram Motorola No. 63P81011E42-A 8/20/75-PO

REFERENCE MOTOROLA SYMBOL PART NO.	DESCRIPTION
---------------------------------------	-------------

PARTS LIST

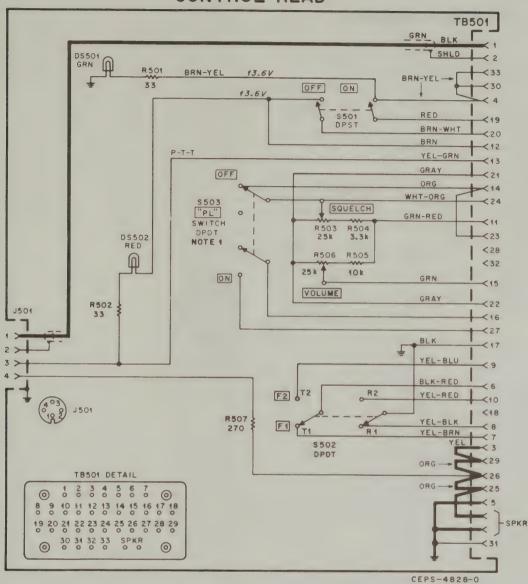
CONTROL HEADS

TRUNK-MOUNT 1-FREQ. & 4-FREQ.

TCN6026AE (Carrier Squelch, 1-Freq.)
TCN6026AG ("Private-Line" Tone-Coded Squelch, 1-Freq.)
TCN6026AJ (Carrier Squelch, 4-Freq.)
TCN6026AK ("Private-Line" Tone-Coded Squelch, 4-Freq.)

		PL-772-C
DS501, 502	65K4151	LAMP, incandescent: min. bay.; 6-8 V; 0.2 A; type No. 51
J501	9K830418	CONNECTOR, receptacle: female; 4-contact; does not include: 4S7699 LOCKWASHER: 13/16" internal; 2A482070 NUT, machine: ring type (knurled)
R501, 502 R503 R504 R505 R506	17C82350A04 18K857840 6S5581 6S6320 18K868896	RESISTOR, fixed: ±10%; 1/2 W: unl stated 33 ±10%; 2 W variable: 25K ±30%; 0.33 W 3.3K 10K variable: 25K ±30%; 0.33 W; includes switch S501 (TCN6026AE, AJ) variable: 25K ±30%; 0.33 W (TCN6026AG, AK)
R507	6S6336	270; 1 W
S501 S502	or40K80247 40C83624D01	SWITCH: dpst; p/oR506 (TCN6026AE, AJ) toggle: dpst (TCN6026AG, AK) rotary: 1-pole; 4-position; non-shorting
S503	40A80246	toggle: dpdt
TB501	31C83826D02	TERMINAL BOARD: 35 female contacts
XDS501,502	9B863168	LAMPHOLDER: miniature bayonet type
	NON-REFERE	NCED ITEMS
	TON-REDI ERE	I EWIS
	61B83678D01 61B83678D02 3A82670A01	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type; 2 req'd (control head
	36K858652	mounting) KNOB, control: 2 req'd (VOL & SQ.)
	36B82869D01 26B83806D01	KNOB, control: (freq. selector) SHIELD, light: (for light- dependent resistor located on
	3A82227A02	"dimmer" board) SCREW, machine: specialtype: 4 req'd
	15C82401D01 1V868494 13D857971 13D857975 13D82286C23 13D82286C22 7B82400D01	COVER, housing: (back) HOUSING, control head ESCUTCHEON (TCN6026AE) ESCUTCHEON (TCN6026AG) ESCUTCHEON (TCN6026AJ) ESCUTCHEON (TCN6026AK) BRACKET, control head
	3S7302 3S7544	mounting SCREW, machine: 10-32x3/8" plain hex head; 2 req'd (for mounting control head on bracket SCREW tapping: No. 8x1/2"
	001011	SCREW, tapping: No. 8x1/2" plain hex head; 3 req'd. (for mounting bracket)

TRUNK-MOUNT CONTROL HEAD



NOTES:

1. S503 AND ASSOCIATED WIRING USED IN "PRIVATE-LINE" MODELS ONLY.

EPS-4832-O

PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Control Head Used in 2-Frequency Radio Sets Schematic Diagram Motorola No. 63P81011E43-A 8/20/75-PO

PARTS LIST

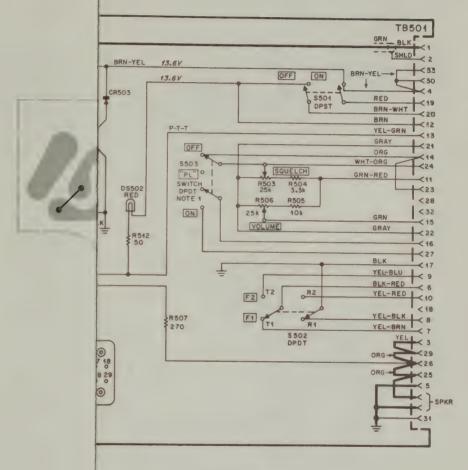
CONTROL HEADS

TRUNK-MOUNT, 2-FREQUENCY

TCN6026AF (Carrier Squelch)
TCN6026AH ("Private-Line" Tone-Coded Squelch)

		PL-775-D
DS501, 502	65K4151	LAMP, incandescent: min. bay.; 6-8 V; 0.2 A; type No. 51
J501	9K830418	CONNECTOR, receptacle: female; 4-contact; does not include: 487699 LOCKWASHER; 13/16" internal; 2A482070 NUT, machine: ring type (knurled)
R501, 502 R503 R504 R505 R506	17C82350A04 18K857840 6S5581 6S6320 18K868896	RESISTOR, fixed: ±10%; 1/2 W: unl stated 33 ±10%; 2 W variable: 25K ±30%; 0.33 W 3.3K 10K variable: 25K ±30%; 0.33 W; includes switch S501 (TCN6026AH) variable: 25K ±30%; 0.33 W (TCN6026AF)
R 507	6S6336	270; 1 W
S501 S502, 503	or40K80247 40A80246	SWITCH: dpst; p/o R506 (TCN6026AH) toggle: dpst (TCN6026AF) toggle: dpdt
TB501 XDS501, 502	31C83826D02 9B863168	TERMINAL BOARD: 35 female contacts LAMPHOLDER: miniature bayonet type
	NON-REFERE	NCED ITEMS
	NON-REFERE 61B83678D01 61B83678D02 3A82670A01 36K858652 3A82227A02 15C82401D01 1V868494 13K857972 13K857976 7B82400D01 3S7302	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type; 2 req'd (control head mounting) KNOB, control: 2 req'd (VOL & SQ.) SCREW, machine: special type; 4 req'd. COVER, housing: (back) HOUSING, control head ESCUTCHEON (TCN6026AF) ESCUTCHEON (TCN6026AH) BRACKET, control head mounting SCREW, machine: 10-32 x 3/8" plain hex head; 2 req'd (for mounting control head on bracket) SCREW, tapping: No. 8 x 1/2" plain hex head; 3 req'd (for mounting bracket)

UNK-MOUNT TROL HEAD



DEPS-4829-0

PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Control Heads With Dimmer Used in 2-Frequency Radio Sets Schematic Diagram & Circuit Board Detail Motorola No. 63P81011E44-O 8/20/75-PO

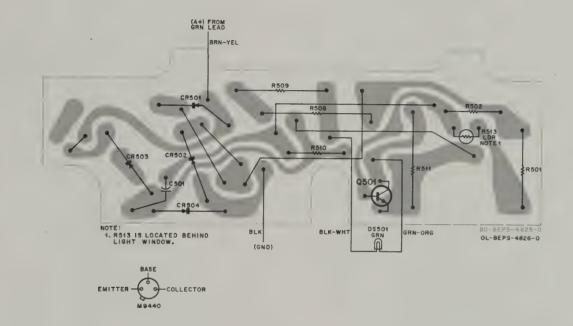
PARTS LIST

CONTROL HEADS

TRUNK-MOUNT, 2-FREQUENCY

TCN6026AF (Carrier Squelch)
TCN6026AH ("Private-Line" Tone-Coded Squelch)

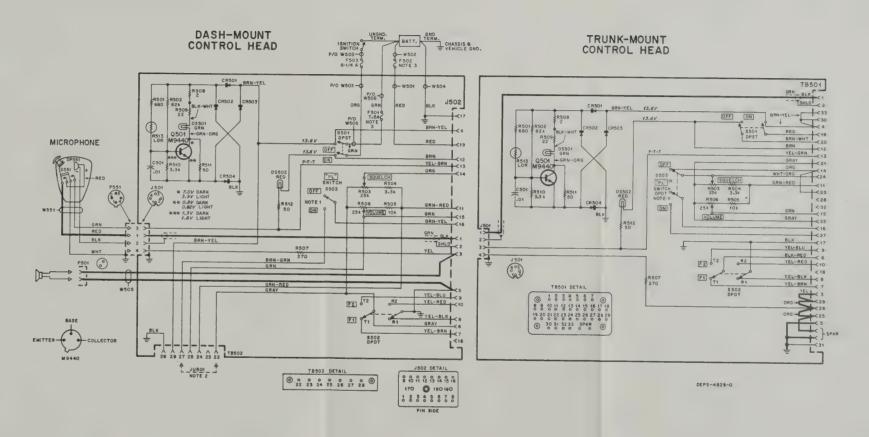
		PL-775-D
DS501, 502	65K4151	LAMP, incandescent: min. bay.; 6-8 V; 0.2 A; type No. 51
J501	9K830418	CONNECTOR, receptacle: female; 4-contact; does not include: 487699 LOCKWASHER; 13/16" internal; 2A482070 NUT, machine: ring type (knurled)
R501, 502 R503 R504 R505 R506	17C82350A04 18K857840 6S5581 6S6320 18K868896	RESISTOR, fixed: ±10%; 1/2 W: unl stated 33 ±10%; 2 W variable: 25K ±30%; 0.33 W 3.3K 10K variable: 25K ±30%; 0.33 W; includes switch S501 (TCN6026AH) variable: 25K ±30%; 0.33 W (TCN6026AF)
R507	6S6336	270; 1 W
S501 · S502, 503	or40K80247 40A80246	SWITCH: dpst; p/o R506 (TCN6026AH) toggle: dpst (TCN6026AF) toggle; dpdt
TB501 XDS501,502	31C83826D02 9B863168	TERMINAL BOARD: 35 female contacts LAMPHOLDER: miniature bayonet type
	NON-REFERE	NCED ITEMS
		NODD ITEMS
	61B83678D01 61B83678D02 3A82670A01 36K858652	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type; 2 req'd (control head mounting) KNOB, control: 2 req'd (VOL &
	3A82227A02	SQ.) SCREW, machine: special type;
	15C82401D01 1V868494 13K857972 13K857976	4 req'd. COVER, housing: (back) HOUSING, control head ESCUTCHEON (TCN6026AF) ESCUTCHEON (TCN6026AH)
	3S7302	BRACKET, control head mounting SCREW, machine: 10-32 x 3/8" plain hex head; 2 req'd (for mounting control head on bracket)
	3S7544	SCREW, tapping: No. 8 x 1/2" plain hex head; 3 req'd (for mounting bracket)



NOTES:

- S503 AND ASSOCIATED WIRING USED IN "PRIVATE-LINE" MODELS ONLY.
 JUS01 USED IN "PRIVATE-LINE" MODELS ONLY,
 DO NOT USE SLOW-BLOW FUSE.

EPS-4845-0



PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Control Heads With Dimmer Used in 2-Frequency Radio Sets Schematic Diagram & Circuit Board Detail Motorola No. 63P81011E44-O 8/20/75-PO

REFERENCE MOTOROLA SYMBOL PART NO. DESCRIPTION

PARTS LIST

CONTROL HEADS

DASH-MOUNT WITH DIMMER, 2-FREQUENCY

TCN6141AF (Carrier Squelch)
TCN6141AH ("Private-Line" Tone-Coded Squelch) PL-1195-O

428B62 466H01 1099 82 52447 418 45 57698 445 57698 336G03 322D09 31 91B15	CAPACITOR, fixed: .01 uF +80-20%; 200 V SEMICONDUCTOR DEVICE, diode: (SEE NOTE) silicon LAMP, incandescent: min. bay: 6-8 V: 0.2 A; type No. 51 FUSE, cartridge: 1-1/4" x 1/4": 32 V: 7.5 A 25 A CONNECTOR, receptacle: fermale: 4-cont: does not inc: 487699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%; 0.33 W 10k var: 25k ±30%; 0.33 W; incl. switch 5501 (TCN6141AH) var: 25k ±30%; 0.33 W (TCN6141AF) 270: 1 W 2.±5%: 3 W 2.±5%: 3 W 2.2 ±5%: 3 W 3.3k: 1/4 W 50 ±5%: 3 W 3.3k: 1/4 W 50 ±5%: 3 W 3.3k: 1/4 W
118 118 118 118 118 118 118 118 118 118	diode: (SEE NOTE) silicon LAMP, incandescent: min. bay: 6-8 V: 0.2 A; type No. 51 FUSE, cartridge: 1-1/4" x 1/4": 32 V: 7: 5 A 25 A 6-1/4 A CONNECTOR, receptacle: female: 4-cont: does not inc. 487699 LOCKWASHER: 13/1 internal: 24482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0. 33 W; incl. switch S501 (TCN6141AH) var: 25k ±30%: 0. 33 W; incl. switch S501 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W
118 118 118 118 118 118 118 118 118 118	LAMP, incandescent: min. bay: 6-8 V: 0.2 A: type No. 51 FUSE, cartridge: 1-1/4" x 1/4": 32 V: 7.5 A 25 A 6-1/4 A CONNECTOR, receptacle: female: 4-cont: does not inc. 437699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-F-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0.33 W; incl. switch 5501 (TCN6141AH) var: 25k ±30%: 0.33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 3.3k: 1/4 W 50 ±5%: 3 W 3.3k: 1/4 W
1999 1999 1882 1818 1818 1896 1896 1896 1896 1896 1896 1998	min. bay: 6-8 V: 0.2 A: type. No. 51 FUSE, cartridge: 1-1/4" x 1/4": 32 V: 7.5 A 25.A 6-1/4 A CONNECTOR, receptacle: female: 4-cont: does not inc. 487699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0.33 W 3.3k 10k var: 25k ±30%: 0.33 W; incl. switch \$501 (TCN6141AH) var: 25k ±30%: 0.33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 3.3k: 1/4 W 50 ±5%: 3 W 3.3k: 1/4 W 50 ±5%: 3 W 3.3k: 1/4 W
82 3247 118 118 118 118 118 118 118 118 118 11	25 A 6-1/4 A CONNECTOR, receptacle: female: 4-cont: does not inc: 487699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0. 33 W; incl. switch 5501 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) var: 25k ±30%: 0. 33 W (TSN6141AF) var: 25k ±30%: 0. 33 W
82 3247 118 118 118 118 118 118 118 118 118 11	25 A 6-1/4 A CONNECTOR, receptacle: female: 4-cont: does not inc: 487699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0. 33 W; incl. switch 5501 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) var: 25k ±30%: 0. 33 W (TSN6141AF) var: 25k ±30%: 0. 33 W
5247 \$118 550 560 57840 57840 57698 57698 57698 57698 57698	6-1/4 A CONNECTOR, receptacle: female: 4-cont: does not inc 457699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-F-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0. 33 W incl. switch 5501 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 2 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W
418 050 9440 45 8840 8896 57698 136G03 22D09 31 91B15 77B05	CONNECTOR, receptacle: female: 4-cont: does not inc 487699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0. 33 W 3. 3k 10k var: 25k ±30%: 0. 33 W; incl. switch 5801 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W
45 8896 57698 322D09 31 91B15 77B05	female: 4-cont: does not inc 487699 LOCKWASHER: 13/1 internal, 2A482070 NUT, machine: ring type (knurled) female: 19 contact TRANSISTOR, (SEE NOTE) N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0. 33 W 3. 3k 10k var: 25k ±30%: 0. 33 W; incl. switch 5801 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W
45 8896 57698 336G03 22D09 31 91B15 77B05	female: 19 contact TRANSISTOR, (SEE NOTE) N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. stated 680 82k: 1/4 W var: 25k ±30%: 0. 33 W; incl. switch 5501 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W 3. 3k: 1/4 W
45 8840 8896 57698 836G03 22D09 31 91B15 77B05	N-P-N: type M9440 RESISTOR, fixed: ±10%: 1/2 unl. state: 680 82k: 1/4 W var: 25k ±30%: 0. 33 W 10k var: 25k ±30%: 0. 33 W: incl. switch 5501 (TCN6141AH) var: 25k ±30%: 0. 33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 2.2 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W
45 7840 8896 57698 836G03 22D09 31 91B15 77B05	unl. stated 680 82k: 1/4 W var: 25k ±30%; 0.33 W 10k var: 25k ±30%; 0.33 W; incl. switch 550! (TCN6141AH) var: 25k ±30%; 0.33 W (TCN6141AF) 270: 1 W 2 ±5%; 3 W 3.3k: 1/4 W 50 ±5%; 3 W
45 7840 8896 57698 836G03 22D09 31 91B15 77B05	82k: 1/4 W var: 25k ±30%: 0, 33 W 3.3k 10k var: 25k ±30%: 0, 33 W: incl. switch 5501 (TCN6141AH) var: 25k ±30%: 0, 33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 3.3k: 1/4 W 50 ±5%: 3 W
7840 8896 57698 336G03 22D09 31 91B15 77B05	var: 25k ±30%; 0, 33 W 3, 3k 10k var: 25k ±30%; 0, 33 W; incl. switch 5501 (TCN6141AH) var: 25k ±30%; 0, 33 W (TCN6141AF) 270: 1 W 2 ±5%; 3 W 2, ±5%; 3 W 3, 3k; 1/4 W 50 ±5%; 3 W
36G03 22D09 31 91B15 77B05	3.3% 10k 10k var: 25k ±30%; 0.33 W; incl. switch 5501 (TCN6141AH) var: 25k ±30%; 0.33 W (TCN6141AF) 270: 1 W 2 ±5%; 3 W 2.2±5%; 3 W 3.3k; 1/4 W 50 ±5%; 3 W
3896 57698 36G03 22D09 31 91B15 77B05	var: 25k ±30%; 0.33 W; incl. switch 550! (TCN6!4lAH) var: 25k ±30%; 0.33 W (TCN6!4lAF) 270: 1 W 2 ±5%; 3 W 3.3k; 1/4 W 50 ±5%; 3 W
36G03 22D09 31 91B15 77B05	switch 5501 (TCN6141AH) var: 25k ±30%; 0.33 W (TCN6141AF) 270: 1 W 2 ±5%; 3 W 22 ±5%; 3 W 3, 3k; 1/4 W 50 ±5%; 3 W
36G03 22D09 31 91B15 77B05	var: 25k ±30%: 0.33 W (TCN6141AF) 270: 1 W 2 ±5%: 3 W 22 ±5%: 3 W 3.3k: 1/4 W 50 ±5%: 3 W
36G03 22D09 31 91B15 77B05	(TCN6141AF) 270: 1 W 2 ±5%: 3 W 22 ±5%: 3 W 3. 3k; 1/4 W 50 ±5%: 3 W
36G03 22D09 31 91B15 77B05	270: 1 W 2 ±5%: 3 W 22 ±5%: 3 W 3. 3k: 1/4 W 50 ±5%: 3 W
36G03 22D09 31 91B15 77B05	22 ±5%; 3 W 3. 3k; 1/4 W 50 ±5%; 3 W
31 91B15 77B05	3. 3k; 1/4 W 50 ±5%; 3 W
91B15 77B05	50 ±5%; 3 W
77B05	
	50: 5 W
8D01	light dependent type; 6.4k-16 @ 25°C
	SWITCH: dpst: p/o R506 (TCN6141AH)
0247	toggle dpst (TCN6141AF)
46	toggle: dpdt
44D01	slide; dpst
4A18	CABLE ASSEMBLY, power: includes F501, XF501 and th following items: 10S345 CABI
	power; no. 18 ga., str.; GR1 107" length req'd. 29K86506
	LUG, ring tongue
DA 13	incl. F502, XF502 and the following items: 30K813233
	following items: 30K813233 CABLE, power: No. 10 ga. str: RED: 9-1/2 ft. length
5A06	req'd incl. F503, XF503 and the
	following items: 10M343 CABLE, power: No. 18 ga. str: ORG; 66" length req'd
572	CABLE, power: No. 10 ga. str; BLK; 10 ft.
	length req'd
5H02	2-cond; each cond No. 18 ga. str; 36" length req'd
	LAMPHOLDER: miniature bayonet type
	5A13 5A06 572 5H02

SYMBOL SYMBOL	MOTOROLA PART NO.	DESCRIPTION
---------------	----------------------	-------------

XF501, 502 503		FUSEHOLDER: "In-line" type; c/o; 14A82882A01 BODY, 14A82883A02 CAP, 42A82384A01 CLIP, cont: 2 req'd. 41A82885A01 SPRING, compression
	NON-REFERE	NCED ITEMS
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02 1V80708B72 15D83576D07 13K857972 13K857976 1V80700B07	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type 2 req'd (control head mtg) KNOB, control: 3 req'd SHELD, light: (for light de- pendent resistor located on "dimmer" board) SCREW, machine: special type 4 req'd HOUSING, control head ESCUTCHEON (TGN6141AF) ESCUTCHEON (TGN6141AF) LIGHT DIMMER BOARD (complete assembly)

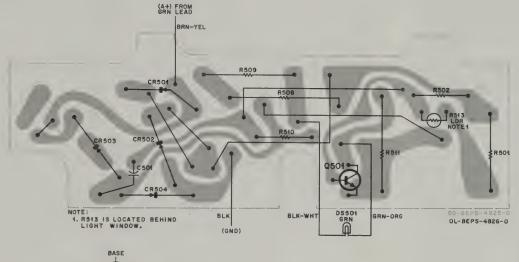
FERENCE	MOTOROLA PART NO.	DESCRIPTION	ı

CONTROL HEADS
TRUNK-MOUNT WITH DIMMER, 2-FREQUENCY

N6098BF (Ca N6098BH ("F N6136AF (Ca N6136AH ("F	rrier Squelch) Private-Line" Te Private-Line" Te	one-Coded Squelch) one-Coded Squelch) PL-1190-O
2501	21D82428B62	CAPACITOR, fixed: .01 uF +80-20%; 200 V
		SEMICONDUCTOR DEVICE, diode: (SEE NOTE)
CR501 thru 604	48C82466H01	diode: (SEE NOTE)
		LAMP, incandescent:
OS501, 502	6S4151	LAMP, incandescent: min. bay; 6-8 V; 0.2 A; type No. 51
1501	9K830418	CONNECTOR, receptacle: female: 4-cont: does not incl. 4S7699 LOCKWASHER: 13/16" internal, 2A482070 NUT, machine: ring type (knurled)
		TRANSISTOR: (SEE NOTE) N-P-N; type M9440
2501	48R869440	N-P-N; type M9440
		RESISTOR, fixed: ±10%: 1/2 W;
R501	6S6040	unl. stated
1501	6S129145	82k: 1/4 W
R 503	18K857840	var; 25k ±30%; 0.33 W
R 504	6S5581	3. 3k
R505	6S6320	10k
1506	18K868896	var; 25k ±30%; 0.33 W; incl. switch S501 (TCN6098BH, TCN6136AH)
	or18C857698	var: 25k ±30%; 0.33 W (TCN6098BF, TCN6136AF)
R507	656336	270; 1 W
1508	17C82036G03	2 ±5%; 3 W
1509	17D83122D09	22 ±5%; 3 W
1510	65129231	3.3k; 1/4 W 50 ±5%; 3 W
1511	17C82291B15	50 ±5%; 3 W
1512	17D82177B05	
1513	6C83828D01	light dependent type; 6.4k-10k @ 25°C
501		SWITCH: dpst: p/o R506 (TCN6098BH, TCN6136AH)
.501		TCN6136AH)
	or40K80247	toggle; dpst (TCN6098BF,
ľ		TCN6136AF)
502, 503 504	40A80246 40B83444D01	toggle; dpdt slide; dpst
504	40883444001	
B501	31C83826D01	TERMINAL BOARD: 35 female contacts
. 2301		
DS501, 502	9B863168	LAMPHOLDER: miniature bayonet type
	NON-REFERE	NCED ITEMS
	61B83678D01	LENS, indicator light: RED
	61B83678D02	LENS, indicator light: RED LENS, indicator light: GRN
	3A82670A01	SCREW, machine: special type 2 req'd (control head mtg)
	36K858652	KNOB, control: 2 req'd (VOL & SQUELCH)
	26B83806D01	SQUELCH) SHIELD, light: (for light-de- pendent resistor located on
	3A82227A02	"dimmer" board) SCREW, machine; special type
	15C82401D01	4 req'd COVER, housing: (back)
	15C82401D01 15D83576D03	HOUSING, control head
	13K857972	ESCUTCHEON (TCN6098BF)
	13K857976	ESCUTCHEON (TCN6098BH) ESCUTCHEON (TCN6136AF)
	13C84067B02	ESCUTCHEON (TCN6136AF)
	13C84067B01	ESCUTCHEON (TCN6136AH)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	7B82400D01 3S7302	BRACKET, control head mtg + SCREW, machine: 10-32 x 3/8' plain hex head: 2 req'd (for mtg control head on bracket)
	3S7544	SCREW, tapping: No. 8 x 1/2" plain hex head; 3 req'd (for mtg bracket)
	1V80700B07	LIGHT DIMMER BOARD (Complete assembly)

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

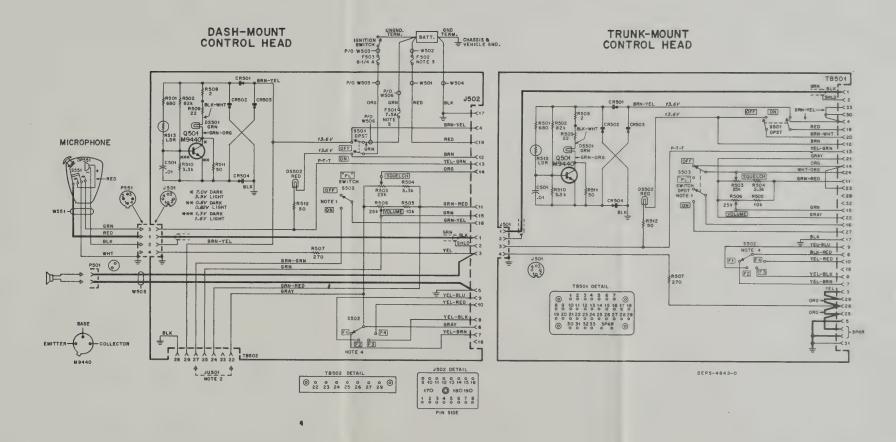


NOTES:

- 1. \$503 AND ASSOCIATED WIRING USED IN "PRIVATE-LINE" MODELS

- South Associated whining used in "PRIVATE-LINE" MODELS ONLY.
 Justi used in "PRIVATE-LINE" MODELS ONLY.
 JO NOT USE SLOW-BLOW FUSE
 South ASSOCIATED WIRING USED IN MULTIPLE FREQUENCY MODEL ONLY.

EPS-4843-0



PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Control Heads With Dimmer Used in 1- & 4-Frequency Radio Sets Schematic Diagram & Circuit Board Detail Motorola No. 63P81011E57-O 8/20/75-PO

	-			$\overline{}$
REFERENCE	MOTOROLA			
SYMBOL	PART NO.	DESCR	IPTION	- 1

PARTS LIST

CONTROL HEADS

WITH DIMMER
DASH-MOUNT 1-FREQ. & 4-FREQ.

TCN6141AE (Carrier Squelch, 1-Freq.)

CN614IAK ("	Private-Line" I	one-Coded Squelch, 4-Freq.) PL-1193
		CAPACITOR, fixed
C501	21D82428B62	CAPACITOR, fixed: 01 uF +80-20%; 200 V
		SEMICONDUCTOR DEVICE,
		diode: (SEE NOTE)
CR501 thru	48C82466H01	silicon
504		
		LAMP, incandescent:
DS501, 502	654151	min. bay.; 6-8 V; 0.2 A; type
		min. bay.; 6-8 V; 0.2 A; type No. 51
		FUSE, cartridge: 1-1/4" x 1/
		32 V: 7. 5 A
F 501	65K86099	
F502 F503	65B475247	25 A 6-1/4 A
1 503	0084/544/	
		CONNECTOR, receptacle: female: 4-contact; does not
J50:	9K830418	
		include: 4S7699 LOCKWASHEI 13/16" internal 2A482070 NUT
		machine; ring type (knurled)
J502	9C801050	female: 19-contact
		CONNECTOR, plug:
P501	9B855112	CONNECTOR, plug: female: 2-contact: does not include 15B855111 SHELL,
		include 15B855111 SHELL,
		connector
		TRANSISTOR: (SEE NOTE)
Q501	48R869440	N-P-N; type M9440
		RESISTOR, fixed: ±10%: 1/2 W
		unl. stated
R 50 I R 50 Z	6S6040 6S129145	680 82k; 1/4 W
R 502	18K857840	variable; 25k; ±30%; 0.33 W
R 504	6S5581	3.3k
R 505	6S6320	10k
R506	18K868896	variable: 25k ±30%; 0.33 W;
		includes switch S501
	or18C857698	(TCN6141AE, AJ) variable: 25k ±30%; 0.33 W
	01100051070	(TCN6141AG, AK)
R 507	.656336	270; 1 W
R 508	17C82036G03	2 ±5%; 3 W
R 509 R 510	17D83122D09 6S129231	22 ±5%; 3 W 3. 3k; 1/4 W
R511	17C82291B15	3.3K; 1/4 W 50 ±5%; 3 W
R512	17D82177B05	50; 5 W
R513	6C83828D01	light dependent type; 6.4k-10k
		@ 25°C
		SWITCH:
5501	or40K80247	dpst; p/o R506 (TCN6141AE, A toggle dpst (TCN6141AG, AK)
5502	40C83624D0!	rotary; 1-pole; 4-position;
		non-shorting
5503	40A80246	toggle: dpdt
		CABLE ASSEMBLY, power: includes F501, XF501 and the
W 501	1V80764A18	includes F501, XF501 and the
		following items:
		10S345 CABLE, power: No. 18 ga., str.; GRN: 107" length
		req'd: 29K865065 LUG, ring-
		tongue
W 502	1V80705A13	includes F502, XF502 and the
		following items:
		30K813233 CABLE, power: No.
		10 ga., str.; RED; 9-1/2 ft. length req'd.

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

W503	1V80705A06	includes F503, XF503 and the following items: 10M343 CABLE, power: No. 18 ga., str.; ORG: 66" length req'd
W504 W505	30K831572 30C83155H02	CABLE, power: No. 10 ga., str.: BLK; 10 ft. length req'd. 2-conductor; each conductor No. 18 ga., str.: 36" length req'd.
XDS501, 502	9B863168	LAMPHOLDER: miniature bayonet type
XF501, 502, 503		FUSEHOLDER: "in-line" type; consists of: 14A62882A01 BODY 14A82883A02 CAP 42A82884A01 CLIP, contact; 2 req'd.; 41A82885A01 SPRING, compression
	NON-REFERE	NCED ITEMS
	NON-REFERE 61B83678D01 61B83678D02 3A82670A07	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 req'd. (control head
	61B83678D01 61B83678D02	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 req'd. (control head mounting) KNOB, control: (2 req'd for TCN6141AE, AG: 3 req'd. for
	61B83678D01 61B83678D02 3A82670A07	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 reg'd. (control head mounting) KNOB, control: (2 reg'd for TCN6141AE, AG: 3 reg'd. for TCN6141AJ, AK) SHIELD, light: (for light- dependent resistor located on
	61B83678D01 61B83678D02 3A82670A07 36B82629H02	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 req'd. (control head mounting) KNOB, control: (2 req'd for TCN6141AE, AG: 3 req'd. for TCN6141AJ, AK) SHELD, light: (for light-
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 reg'd. (control head mounting) KNOB, control: (2 req'd for TCN6141AE, AG; 3 req'd. for TCN6141AJ, AK) SHIELD, light: (for light- dependent resistor located on "dimmer" board) SCREW, machine: special type 4 req'd.
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02 1V80708B72	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 req'd. (control head mounting) KNOB, control: (2 req'd for TCN6141AE, AG: 3 req'd. for TCN6141AJ, AK) SHELD, light: (for light- dependent resistor located on "dimmer" board) SCREW, machine: special type 4 req'd. COVER, housing: (back)
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02 1V80708B72 15D83576D07	LENS. indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 reg'd. (control head mounting) KNOB, control: (2 req'd for TCN6141AE, AG; 3 req'd. for TCN6141AJ, AK) SHIELD, light: (for light- dependent resistor located on "dimmer" board) SCREW, machine: special type 4 req'd. COVER, housing: (back) HOUSING, control head
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02 1V80708B72 15D83576D07 15D83576D07	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 reg'd. (control head mounting) KNOB, control: (2 reg'd for TCN6141AE, AG: 3 reg'd. for TCN6141AJ, AK) SHELD, light: (for light- dependent resistor located on "dimmer" board) SCREW, machine: special type 4 reg'd. COVER, housing: (back) HOUSING, control head ESCUTCHEON (TCN6141AE)
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02 1V80708B72 15D83576D07	LENS. indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 reg'd. (control head mounting) KNOB, control: (2 reg'd for TCN6141AE, AG; 3 reg'd. for TCN6141AJ, AK) SHIELD, light; (for light- dependent resistor located on "dimmer" board) SCREW, machine: special type 4 reg'd. COVER, housing: (back) HOUSING, control head ESCUTCHEON (TCN6141AE) ESCUTCHEON (TCN6141AE)
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02 1V80708B72 15D83576D07 13D857971 13D857975	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 reg'd. (control head mounting) KNOB, control: (2 reg'd for TCN6141AE, AG: 3 reg'd. for TCN6141AJ, AK) SHELD, light: (for light- dependent resistor located on "dimmer" board) SCREW, machine: special type 4 reg'd. COVER, housing: (back) HOUSING, control head ESCUTCHEON (TCN6141AE)
	61B83678D01 61B83678D02 3A82670A07 36B82629H02 26B83806D01 3A82227A02 1V80708B72 15D83576D07 13D837971 13D827866C33	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type: 2 reg'd. (control he ad mounting) KNOB, control: (2 req'd for TCN6141AE, AG; 3 req'd. for TCN6141AJ, AK) SHELD, light: (for light- dependent resistor located on "dimmer" board) SCREW, machine: special type 4 req'd. COVER, housing: (back) HOUSING, control head ESGUTCHEON (TCN6141AE) ESGUTCHEON (TCN6141AJ)

	I I	
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

CONTROL HEADS

WITH DIMMER
TRUNK-MOUNT 1-FREQ. & 4-FREQ.

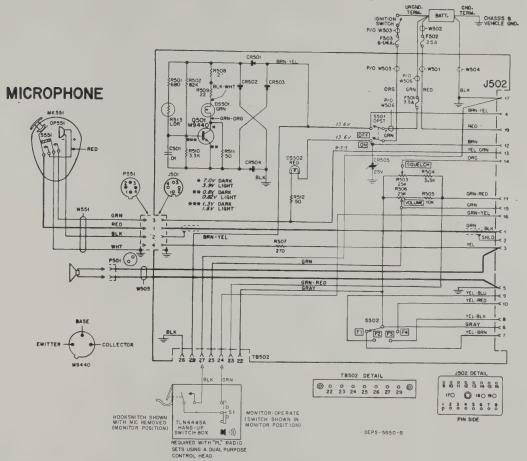
N6098BE (C: N6098BG (''I N6098BJ (C: N6098BK (''I	arrier Squelch, Private-Line" To arrier Squelch, Private-Line" To	l-Freq.) one-Coded Squelch, l-Freq.) 4-Freq.) one-Coded Squelch, 4-Freq.)
		PL-1194-O
		CARACITOR Gual.
501	21D82428B62	CAPACITOR, fixed: 01 uF +80-20%: 200 V
	E I DOLTEODOL	01 dr 180-20%, 200 V
		SEMICONDUCTOR DEVICE,
		diode: (SEE NOTE)
R501 thru	48C82466H01	silicon
)4	40002400001	Silicon
J-1:	1	
	1	
	1,	LAMP, incandescent: min. bay.; 6-8 V: 0.2 A; type No. 51
S501, 502	6S4151	min. bay.; 6-8 V; 0.2 A; type
	1	No. 51
		1
	1	CONNECTOR, receptacle; female; 4-contact; does not
501	9K830418	female; 4-contact; does not
	1	include: 4S7699 LOCKWASHER;
	1	13/16" internal; 2A482070 NUT,
	1	machine; ring type (knurled)
	1	TRANSISTOR: (SEE NOTE)
501	48R869440	N-P-N: type M9440
		RESISTOR, fixed: ±10%; 1/2 W;
		unl. stated
501	6S6040	680
502	6S129145	82k; 1/4 W
503	18K857840	variable: 25k ±30%; 0.33 W
504	6S5581	3. 3k
505	6S6320	10k
506	18K868896	variable; 25k ±30%; 0.33 W;
,00	1011000070	includes switch S501
		(TCN6098BE, BJ)
	or18C857698	variable; 25k ±30%; 0.33 W
	01100037078	
507	6S6336	(TCN6098BG, BK)
508	17C82036G03	270: 1 W 2 ±5%; 3 W
509	17D83122D09	22 ±5%; 3 W
510	6S129231	3.3k; 1/4 W
511	17C82291B15	50 ±5%; 3 W
512	17D82177B05	50; 5 W
513	6C83828D01	light dependent type; 6.4k-10k
		@ 25°C
1		
		SWITCH:
01		SWITCH: dpst: p/oR506 (TCN6098BE, BJ)
	or40K80Z47	toggle: dpst (TCN6098BG, BK)
02	or40K80Z47 40C836Z4D01	rotary; 1-pole; 4-position;
		non-shorting
03	40A80246	toggle; dpdt
-	10000040	togg.c, apar
		TERMINAL BOARD.
3501	21002026001	TERMINAL BOARD:
1000	31C83826D01	35 female contacts
0001 500	000/22/0	LAMPHOLDER:
\$501, 502	9B863168	miniature bayonet type
	L	
	NON-REFERE	NCED ITEMS
	61B83678D01	LENS, indicator light: RED
	61B83678D02	LENS, indicator light: GRN
	3A82670A01	SCREW, machine: special
		type; 2 req'd. (control head
		mounting)
	36K858652	KNOB, control: 2 req'd. (VOL
	1011033030	& SQ.)
	36B82869D01	KNOB, control: (freq. selector)
	26B83806D01	CHIEF D Niche (for Niche
	10000000001	SHIELD, light: (for light-
		dependent resistor located on "dimmer" board)
	3A82227A02	SCREW, machine: special type:
		4 req'd.
	15C82401D01	COVER, housing: (back)
	15D83576D03	HOUSING, control head
	13D857971	ESCUTCHEON (TCN6098BE)
		O I O I I DO I (I O I TO U 70 D E)
		ESCUTCHEON (TCN/000PC)
	13D857975	ESCUTCHEON (TCN6098BG) ESCUTCHEON (TCN6098BJ)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	13D82286C22	ESCUTCHEON (TCN6098BK)
	7B82400D01	BRACKET, control head
		mounting
	3S7302	SCREW, machine: 10-32 x 3/8"
		plain hex head; 2 req'd (for
		mounting control head on
		bracket)
	3S7544	SCREW, tapping: No. 8 x 1/2"
		plain hex head; 3 req'd. (for
	1	mounting bracket)
	1V80700B07	LIGHT DIMMER BOARD
		(complete assembly)

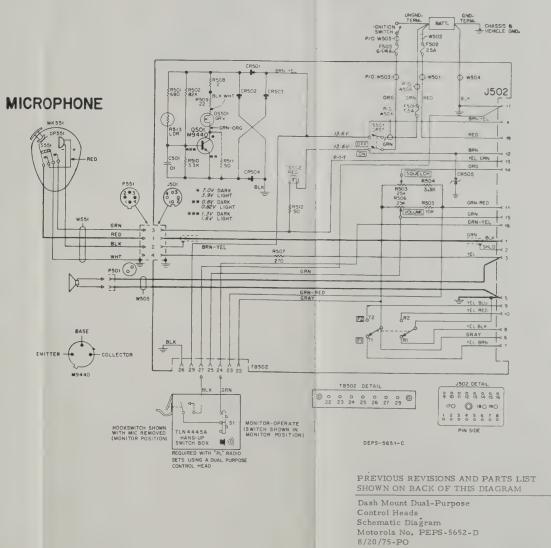
NOTE:

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

DUAL PURPOSE 1 & 4-FREQUENCY DASH MOUNT CONTROL HEAD



DUAL PURPOSE 2-FREQUENCY DASH MOUNT CONTROL HEAD



REVISIONS PEPS-5652-D

CHASSIS AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
TCN6141BE-1 TCN6141BF-1 TCN6141BJ-1	CR505	Added 48-83461E45	TB501-12

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

PARTS LIST

CONTROL HEADS

WITH DIMMER DASH-MOUNT 1-FREQ. & 4-FREQ.

TCN6141BE (Dual Purpose, 1-Freq.)
TCN6141BJ (Dual Purpose, 4-Freq.)

PL-1321-A

CR505	48-83461 E45	SEMICONDUCTOR DEVICE, diode: (SEE NOTE) dual Zener type; 25 V
DS501, 502	6S4151	LAMP, incandescent:
23301, 302	034151	No. 51
F501	65K86099	FUSE, cartridge: 1-1/4"x1/4"; 32 V: 7.5 A
F502	65\$61682	25 A
F503	65B475247	6-1/4 A
	03211321	
J501	9K830418	CONNECTOR, receptacle: female: 4 contact: does not include: 457699 LOCKWASHER: 13/16" internal ZA482070 NUT,
J502	9C801050	machine: ring type (knurled) female: 19-contact
P501	9B855112	CONNECTOR, plug: female; 2-contact; does not include 15B855111 SHELL, connector
		RESISTOR, fixed: ±10%; 1/2 W:
R 503	18K857840	variable: 25k ±30%; 0,33 W
R504	6S5581	3.3k
R 505	656320	10k
R506	18K868896	variable: 25k ±30%; 0,33 W;
		includes switch S501
R507	6S6336	270; 1 W
R512	17D82177B05	50; 5 W
S501		SWITCH: dpst; p/o R506
S502	40C83624D01	rotary: 1-pole; 4-position
		non-shorting (TCN6141BJ)
TB502	31C84922A01	BOARD, terminal:
1 8502	31C84922A01	
W501	1V80764A18	CABLE ASSEMBLY, power: includes F501, XF501 and the following items: 10S345 CABLE, power: No. 18 ga.,
		str.: GRN: 107" length reg'd:
		29K865065 LUG, ring-tongue
W502	1V80705A13	includes F502, XF502 and the
		following items: 30K813233 CABLE, power: No. 10 ga., str.; RED; 9-1/2 ft. length req'd
W503	1V80705A06	includes F503, XF503 and the following items: 10M343 **CABLE, power; No. 18 ga.,
		str.; ORG; 66" length req'd
W 504	30K831572	CABLE, power: No. 10 ga., str.; BLK; 10 ft.
W505	30C83155H02	length req'd.
w out	30C83155H0Z	2-conductor; each conductor No. 18 ga., str.; 36" length req'd
		LAMPHOLDER:

REFERENCE MOTOROLA SYMBOL PART NO.

XF501,502,		FUSEHOLDER: "In-line" type; consists of; 14A02882A01 BODY 14A02883A02 CAP 42A0284A01 CLIP, contact; 2 reg'd; 41A02885A01 SPRING, compression
1	NON-REFEREN	CED ITEMS
	61B83678D01 61B83678D02 3A82670A07	LENS, indicator light: RED LENS, indicator light: GRN SCREW, machine: special type; 2 req'd (control head
	36B82629HC2	mounting) KNOB, control: (2 req'd for TCN6141BE; 3 req'd for TCN6141BJ)
	26B83806D01	SHIELD, light: (for light- dependent resistor located on "dimmer" board)
	3A82227A02	SCREW, machine: special type; 4 req'd
	1V80708B72	COVER, housing: (back)
	15D83576D07	HOUSING, control head
	13D857971	ESCUTCHEON (TCN6141BE)
	13D82286C23	ESCUTCHEON (TCN6141BJ)
	3B82126B07	SCREW, nylon: 4-40 x 1/4"
	MICRO	PHONE

MN6018A N	dicrophone dicrophone Weather	
		CARTRIDGE, microphone:
DP551	59-82933C01 or59-82933C02	transistor amplifier
	0159-82933002	CONNECTOR, plug:
P551	28-16370	male; 4 contact
S551	40 -82263G02	SWITCH, push: dpst not replaceable;
0331	(TMN6013A)	in TMN6018A: P/O W601
	or40-82263G01	
	(TMN6018A)	
		CORD, microphone:
W 551	1-80707A58	assembly; includes P551 and the
	(TMN6013A)	following items: 41-852707
		SPRING, strain relief 29-847034 LUG, insulation-
		piercing; 4 required
	or1-80724A28	CORD, PLUG & SWITCH ASSY.
	(TMN6018A)	includes P551, S551
	NON-REFERE	NCED ITEMS
	1 -80720A94	CASE, microphone; includes
		hang-up stud
	11-2506	TUBING; No. 9 BLK, 5" length
		required
	3-124693	LOCKSCREW: 6-32 x 1/4"
	42 - 852710	Phillips round head; 2 required STRAP, strain relief
	38 - 852699	PUSHBUTTON
	15-82701B01	COVER, microphone case
		(front)
	32 -82703B01	GASKET: neoprene
	4-114201	WASHER: 1/4" x 0. 156" x . 015
		3 required
	3<127924	LOCKSCREW: 6-32 x 5/16"
	2, 122,424	Phillips round head SCREW, machine: 6-32 x
	3 5132436	13/16" Phillips round head
	42 - 82702B01	RETAINER, mic, cartridge
	1 -865398	MOUNTING KIT, microphone
		includes 64-85596 PLATE mic.
		3 required RETAINER, mic, cartridge MOUNTING KIT, microphon

i	REFERENCE	MOTOROLA PART NO.	DESCRIPTION
ı	SYMBOL	FART NO.	

HEADS

9-1/2 ft length req'd incl F503, XF503 and the follow-

30K831572 CABLE, power: No. 10 ga, str; BLK; 10 ft.

length req'd 30C82155H02 Z-cond; each cond. No. 18 ga,

str; 36" length req'd LAMPHOLDER: miniature bayonet type

FUSEHOLDER:
"in-line" type: c/o;
14A82882A01 BODY

14A82883A02 CAP 42A82884A01 CLIP, cont: 2 req'd, 41A82885A01 SPRING, compression

ing items: 10M343 CABLE, power; No. 18 ga, str; ORG: 66" length req'd

DAG		OL HEADS DIMMER, 2-FREQUENCY
CN6141BF (D		PL-1322
		SEMICONDUCTOR DEVICE,
CDCCC	40 034/3745	diode: (SEE NOTE)
CR505	48-83461E45	dual Zener type; 25 V
DS501, 502	6S4151	LAMP, incandescent: min, bay; 6-8 V; 0.2 A; type
		No. 51
		FUSE, cartridge: 1-1/4" x 1/4
F501	65K86099	32 V: 7,5 A
F502	65S61682	25 A
F503	65B475247	6-1/4 A
		CONNECTOR, receptacle:
J501	9K830418	female: 4-cont; does not incl
		4S7699 LOCKWASHER: 13/16
		internal, 2A482070 NUT,
		machine: ring type (knurled)
J502	9C801050	female; 19-contact
		CONNECTOR, plug:
P501		incl:9B855112 CONNECTOR, p
		connector
		RESISTOR, fixed: ±10%; 1/2
R 503	18K857840	var: 25k ±30%; 0.33 W
R504	6S5581	3. 3k
R 505	6S6320	10k
R 506	18C857698	var; 25k ±30%; 0.33 W
R507	6S6336 17D82177B05	270; 1 W
R512	17082177805	50; 5 W
S501	40K80247	SWITCH:
S502	40A80246	toggle; dpst toggle; dpdt
	101100010	
TB502	31C84922A01	BOARD, terminal: 7 terminal
	J.Co. 77EEROI	
W501	IV80764A18	CABLE ASSEMBLY, power: incl F501, XF501 and the follo
	1	ing items: 105345 CARIE
		power: No. 18 ga., str.: GRN 107" length req'd 29K865065
		107" length req'd 29K865065 LUG, ring tongue
W502	IV80705A13	incl F502, XF502 and the follo
		ing items: 30K813233 CABLE
		power; No. 10 ga, str; RED;
		Q 1/2 ft longth woold

W 503

W 504

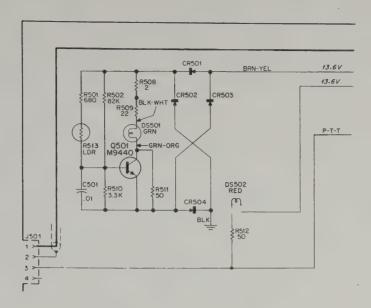
W 505

XF501, 502, 503

XDS501, 502 9B863168

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
---------------------	---------------------	-------------

61B83678D01	LENS, indicator light: RED
61B83678D02	LENS, indicator light: GRN
3A82670A07	SCREW, machine: special type:
	2 req'd (control heat mtg)
36B82629H02	KNOB, control: 3 req'd
26B83806D01	SHIELD, light: (for light de-
	pendent resistor located on
1	"dimmer" board)
3A82227A02	SCREW, machine: special type:
1	4 req'd
1V80708B72	COVER, housing: (back)
15D83576D07	HOUSING, control head
13K857972	ESCUTCHEON
3B82126B07	SCREW, nvlon: 4-40 x 1/4"



REFERENCE MOTOROLA SYMBOL PART NO.	DESCRIPTION
---------------------------------------	-------------

PARTS LIST PILOT LIGHT DIMMER BOARD

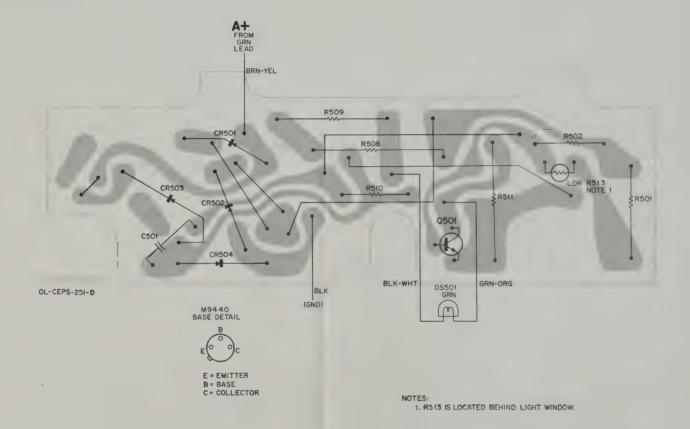
PILOT LIGHT DIMMER BOARD					
1V80700B07 Lig	IV80700B07 Light Dimmer Board PL-151-				
C501	21D82428B62	CAPACITOR, fixed: .01 uF +80-20%; 200 V			
CR 501 thru 504	48C82466H01	SEMICONDUCTOR DEVICE, diode: (SEE NOTE) silicon			
Q501	48R869440	TRANSISTOR, . N-P-N; type M9440			
R501 R502 R508 R509 R510 R511 R513	6S6040 6S129145 17C82036G03 17D83122D09 6S129231 17C82291B15 6C83828D01	RESISTOR, fixed: 680 ±10%; 1/2 W 82K ±10%; 1/4 W 2 ±5%; 3 W 22 ±5%; 3 W 3.3K ±10%; 1/4 W 50 ±5%; 3 W light dependent type; 6.4K-10K © 25°C			
	NON-REFERE	NCED ITEM			
	1V80765A48	CIRCUIT BOARD ASSY. (less components)			

NOTE:

Replacement diodes must be ordered by Motorola part number only for optimum performance.

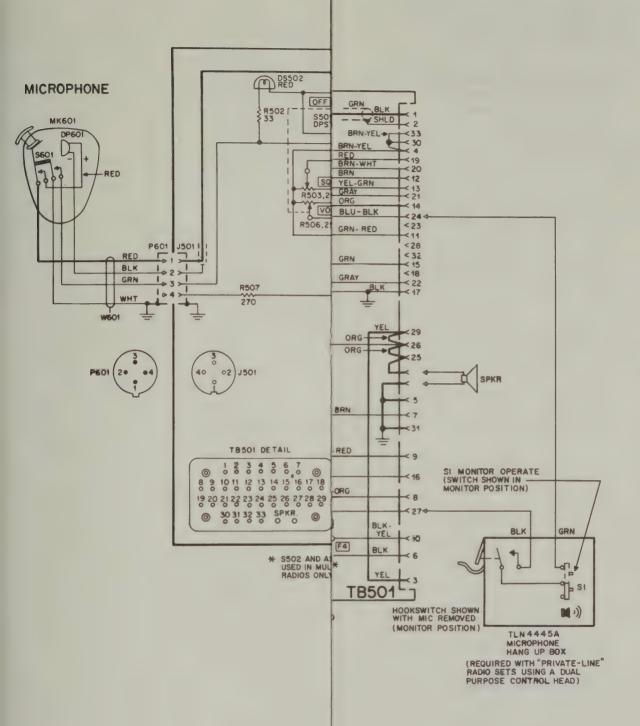
REVISIONS PEPS-250-F

CHASSIS AND REF. SUFFIX NO. SYMBOL		CHANGE	LOCATION	
			NOTES REVISED	



Pilot Light Dimmer Circuit Board Detail Motorola No. PEPS-250-F 8/20/75-PO

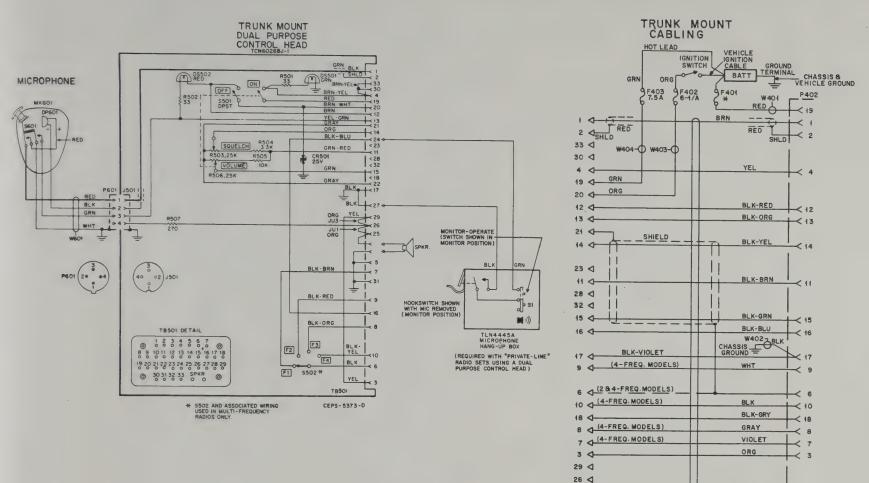




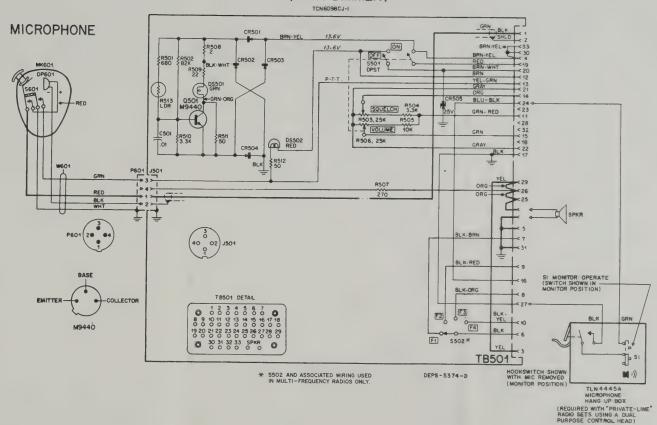
PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Trunk Mount Dual-Purpose Control Heads and Cabling Schematic Diagram Motorola No. PEPS-5653-C 8/20/75-PO





TRUNK MOUNT DUAL PURPOSE CONTROL HEAD (WITH DIMMER)



SPEAKER

8 7 6 5 4 3 2 1

31

★ 25A FUSE USED FOR 30W AND 45W MODELS.
FOR HIGHER POWER MODELS USE 40A FUSE.

CEPS-5089-C

8 7 6 5 4 3 2 1

○19 ○18 ○17

○19 ○18 ○17

○16 15 14 13 12 11 10 9

W405

P402 DETAIL

NOTES:

- 1. NO ELECTRICAL CONNECTION.
- NO ELECTRICAL CONNECTION ON CARRIER SQUELCH MODELS.
 NO ELECTRICAL CONNECTION ON 1-FREQUENCY MODELS.

25 ◁

NO ELECTRICAL CONNECTION ON 1-FREQUENCY MOD
 5502 USED IN MULTI-FREQUENCY RADIOS ONLY.

EPS-5372-0

PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Trunk Mount Dual-Purpose Control Heads and Cabling Schematic Diagram Motorola No. PEPS-5653-C 8/20/75-PO

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

PARTS LIST

IMPORTANT

USE ONLY THE FOLLOWING MOTOROLA PART NUMBERS WHEN ORDERING REPLACEMENT PARTS

	with Dimmer	k Mount 2-Freq. PL-1274-A
		SEMICONDUCTOR DEVICE,
		diode; (SEE NOTE)
CR505	48-8346 IE45	dual Zener type; 25 V
		LAMP, incandscent:
DS501,502	65S4151	min. bay; 6-8 V; 0.2 A; type No. 5l
		CONNECTOR, receptacle:
1501	9K830418	female; 4 contact; does not incl
		4S7699 LOCKWASHER; 13/16"
		internal 2A482070 NUT,
		machine ring (knurled)
		RESISTOR, fixed: ±10%; 1/4 W;
		unl. stated
R503	18K857840	variable; 25k ±30%; 0.33 W
R 504	6R5581	3.3k; 1/2 W
R505	6R6320	10k; 1/2 W
R506	18K868896	variable; 25k ±30%; 0.33 W;
		includes SWITCH, toggle; dpst
		(1-freq)
	or 18C857698	variable; 25k ±30%; 0, 33 W
		(2-freq)
R507	6S6336	270; 1 W
R512	17D82177B05	50; 5 W
		SWITCH:
5501		p/o R506 (1-freq)
	or40K80247	toggle; dpst (2-freq)
S502	40A80246	toggle; dpdt
		TERMINAL BOARD:
TB501	31C83826D01	35 female contact
		LAMPHOLDER.
XDS501, 502	9B863168	min, bay.
	NON-REFERE	ENCED ITEMS
	26B83806D01	SHIELD, light (for R513)
	61B83678D01	LENS, indicator; light; RED
	61B83678D02	LENS, indicator; light; GRN
	3A82670A01	SCREW, control head mounting
		2 req'd
	36K858652	KNOB, control; 2 req'd
	15D83576D03	HOUSING, control head
	13D857971	ESCUTCHEON, cont. hd.

ESCUTCHEON, cont. hd.

(2-freq.)

REFERENCE MOTOROLA SYMBOL PART NO.

PARTS LIST

1 & 2 FREQUENCY MODELS CONTROL HEAD

DESCRIPTION

TCN6026BE (Trunk-Mount, 1-Freq.) Dual Purpose

		SEMICONDUCTOR DEVICE,
CR501	48-83461E45	diode: (SEE NOTE I) dual Zener type; 25 V
01(301	40-03401245	dual Zener type; 25 V
		LAMP, incandescent:
DS501	65-4151	6-8 V; . 2 A; 1 cont; type No. 51
DS502	65-4151	6-8 V, . 2 A; 1 cont; type No. 51
		CONNECTOR, receptacle:
J501	9-830418	female; 4 cont.
		RESISTOR, fixed: unl. stated
R501	17-82350A04	33 ±10%; 2 W
R502	17-82350A04	33 ±10%; 2 W
R503	18-857840	var; 25k ±30%; .33 W
R504	6-5581	3. 3k ±10%; 1/2 W
R505	6-6320	10k ±10%; 1/2 W
R506	18-868896	var; 25k ±30%; .33 W; incl
		dpst switch; 1-freq.
R 507	or18-857698	var; 25k ±30%; .33 W; 2 freq.
R507	6-6336	270 ±10%; 1 W
*		
S501		SWITCH, toggle:
3301	or40-80247	p/o R506; 1-freq.
S502	40-80247	dpst ("on-off"); 2 freq.
5502	40-00240	dpdt ("F1-F2"); 2 freq.
		BOARD, term:
TB501	31-83826D02	35 female; cont term.
		LAMPHOLDER:
XDS501,	9-863168	min; bayonet type
XDS502	9-863168	min; bayonet type
	NON-REFERE	ENCED ITEMS
	61-865158	LENS, indicator light; RED
	61-865159	LENS, indicator light: GRN
	3-82670A01	SCREW, control head
	2/ 050/52	DOREW, CONTROL Head

Replacement diodes must be ordered by Motorola part number only for optimum performance.

NUT, ring; knurled

2-482070

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
---------------------	----------------------	-------------

PARTS LIST

4 FREQUENCY MODELS CONTROL HEAD

Dual Purpos	e)	PL-1232
		SEMICONDUCTOR DEVICE,
		diode: (SEE NOTE I)
CR501	48-83461E45	dual Zener type; 25 V
		LAMP, incandescent:
DS501	65_4151	0.2 A; type No. 51
DS502	65-4151	0.2 A; type No. 51
	1	CONNECTOR, receptacle:
J501	9-830418	female; 4 contact
		RESISTOR, fixed: ±10%;
		unl. stated
R501	17-82350A04	33: 2 W
R502	17-82350A04	33; 2 W
R503	18 - 857840	var. 25k ±30%
R504	6-5581	3, 3k; 1/2 W
R505	6-6320	10k; 1/2 W
R506	18 - 868896	var.; 25k ±30%; 0, 33 W; incl
11500	10 000070	S501
R507	6-6336	270; 1 W
		SWITCH, rotary; unl. stated
S501		dpst; p/o R506
S502	40 -83624D01	l pole; 4 position
	1 1	BOARD, terminal
1B50l	31-83826D02	35 female contacts
		LAMPHOLDER:
XDS501	9 - 863168	single contact; bayonet base
XDS502	9 - 863168	single contact; bayonet base
	NON-REFERE	ENCED ITEMS
	61-865158	LENS, indicator light: GRN
	61-865159	LENS, indicator light RED
	2 492070	NIIIT bounded: 13/6/11 27 v

I. Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

3-82670A01 | SCREW. machine: 6-32 x

36-858652 KNOB, vol. control (2 req'd) 36-82869D01 KNOB, freq. selector

1.44" (2 req'd)

II. When ordering crystal units, specify carrier frequency, crystal frequency and crystal type number.

REFERENCE	MOTOROLA	DESCRIPTION

PARTS LIST

IMPORTANT

USE ONLY THE FOLLOWING MOTOROLA PART NUMBERS WHEN ORDERING REPLACEMENT PARTS

MICROPHONE

MN6018A N	Microphone Weathern	proof PL-924
DP551	59-82933C01 or59-82933C02	CARTRIDGE, microphone: transistor amplifier
P551	28-16370	CONNECTOR, plug:
S551	40-82263G02 (TMN6013A) or40-82263G01 (TMN6018A)	SWITCH, push: dpst not replaceable: in TMN6018A; P/O W601
W 551	1-80707A58 (TMN6013A)	CORD, microphone: assembly; includes P551 and following items: 41-852707 SPRING, strain relief 29-847034 LUG, insulation- piercing; 4 required CORD, PLUG&SWITCH ASS includes P551, S551
	NON-REFERE	
	1 -80720A94	CASE, microphone; includes
		hang-up stud
	11-2506 3-124693	TUBING; No. 9 BLK, 5" leng required LOCKSCREW: 6-32 x 1/4"
	42-852710	Phillips round head; 2 requi STRAP, strain relief PUSHBUTTON
	38-852699 15-82701B01	COVER, microphone case (front)
	32 -82703B01	GASKET: neoprene
	4-114201	WASHER: 1/4" x 0.156" x.0
	3-127924	LOCKSCREW: 6-32 x 5/16" Phillips round head
	3-132436	SCREW, machine: 6-32 x 13/16" Phillips round head 3 required
	42-82702B01	RETAINER, mic, cartridge
	1 -865398	MOUNTING KIT, microphor includes 64-85596 PLATE mi hang-up; 3-122830 SCREW, tapping: No. 8 x 1/2" slotte binder head; 2 required

REFERENCE MOTOROLA SYMBOL PART NO. DESCRIPTION

PARTS LIST

TKN6055A Cable Kit (1-Freq., 12 V)

TKN6056A Cable Kit (2- & Multi-freq., 12 V)

EPD-9982-K

FUSE, cartridge:

0.1	65-61682	25 amp; 32 v
02	65- 475247	6-1/4 amp; 32 v
03	65-86099	7.5 amp; 32 v
. 02	1-80715A24	CONNECTOR, plug: incl: 9 -801050 CONNECTOR, plug: 19-cont; female 15 -82075D03 HOUSING L. H. 15 -82075D01 HOUSING R. H. 3-131758 SCREW, 4-40 x 1-1/8" 2 req'd 2 -129924 NUT, hex: 4-40 x 1/4"; 2 req'd; 1-80717A73 SCREW & KNOB ASSY, 4-11722 WASHER; "C" 4-800671 WASHER: .016" thick 4-82113D01 WASHER: .032" thick; 42 -864148 CLAMP, cable 3-132127 SCREW, tapping:No. 6 x 3/4" plain hex head
101	1-80744A37	CABLE ASSY, special purpose incl: 30.858553 CABLE, power; l cond No. 12 ga; RED 22-1/2ft. req'd 29-832116 LUG, for 3/8"
102	1-864643	stud; ref parts F401 and XF401 incl: 30-858552 CABLE, power: 1 cond; No. 12 ga; BLK; 5-1/2 ft. req'd 29-832116 LUG, for 3/8" stud
103	1-80705A19	oncl. 29-824456 LUG, for No. 10 stud 37-82603D20 SLEEVE, coded No. 20 29-82602D01 CONNECTOR, plug: 1 cont; ref part XF402
04	I-80744A39	incl; 29 -865065 LUG, for 3/8" stud 37 -82603D19 SLEEVE, coded No. 19 29 -82602D01 CONNECTOR, plug: 1 cont; ref part XF403
401	30 -858513 or30 -864650	CABLE, special purpose: 13 cond 17 ft req'd 1-freq 17 cond 17 ft req'd 2- & multi-freq. FUSEHOLDER: incl 14-82882A01 BODY
		14 -82883A01 CAP; 42 - 82884A01 CLIP, fuse: 2 req'd; 41 -82885A01 SPRING
402	1-80705A07	inc: 14-82882A01 BODY 14-82883A01 CAP 41-8288SA01 SPRING 1-80705A08 FUSE CLIP AND LEAD ASSY: inc: 12-82884A01 CLIP, fuse 10-343 LEAD, elect: 1 cond No. 18 ga; ORG; 57" req'd 1-80705A09 FUSE CLIP AND LEAD ASSY: incl. 42-82884A01 CLIP,fuse 30S10310A62 LEAD, elect 1 cond No. 18 ga; ORG; 9"
403	1-80744A38	req'd ref part F402 incl: 14-82882A01 BODY 14-82883A01 CAP 41-82885A01 SPRING 1-80705A11 FUSE CLIP AND LEAD ASSY: incl: 42-82884A01 CLIP, fuse 10-345 LEAD, elect; 1 cond; No. 18 ga; GRN: 97" req'd 1-80705A12 FUSE CLIP AND LEAD ASSY: incl: 42-82884A01 CLIP, fuse 30510310A62 LEAD elect; 1 cond; No. 18 ga; GRN; 9" req'd ref part F403

REFERENCE MOTOROLA PART NO. DESCRIPTION

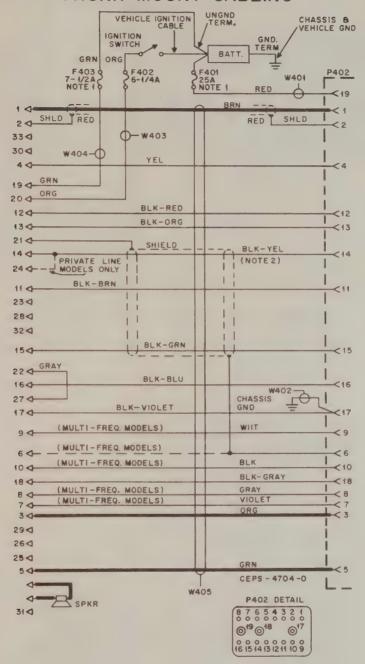
NON-REFERENCED ITEMS				
29 - 8	2602D01	CONNECTOR, plug: male;		
		single cont; 19 req'd		
		SLEEVE, coded:		
37 - 8	2603D01	1		
37 - 8	2603D02	2		
	2603D03	3		
37 - 8	2603D04	4		
37-8	2603D05	5		
37 - 8	2603D06	6		
37 - 8	2603D07	7		
37 - 8	2603D08	8		
37 - 8	2603D09	9		
37 - 8	2603D10	10		
37 - 8	2603D11	11		
37 - 8	2603D12	12		
37-8	26U3D13	13		
37 - 8	2603D14	14		
37 - 8	2603D15	15		
37 - 8	2603D16	16		
		17		
37 - 8		18		
37 - 8	2603D21	21		

NOTE:

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

der z dzpece .	with Dimmer	PL-1237
CR505	48-83461E45	SEMICONDUCTOR DEVICE, diode; (SEE NOTE) dual Zener type; 25 V
DS 501, 502	65S4151	LAMP, incandescent: min. bay; 6-8 V; 0,2 A; type No. 51
J501	9K830418	CONNECTOR, receptacle: female; 4 contact; does not in 457699 LOCKWASHER; 13/16 internal; 2A482070 NUT, machine; ring (knurled)
R503 R504 R505 R506 R507 R512	18K857840 6R5581 6R6320 18K868896 6S6336 17D82117B05	RESISTOR, fixed: ±10%; 1/4 W unl. stated var; 25k ±30%; 0, 33 W 3, 3k; 1/2 W 10k; 1/2 W var; 25k ±30%; 0, 33 W; incl S50 25; 5 W
S501 S502	40C83624D01	SWITCH, rotary dpst (p/o R506) 1 pole; 4 position
TB501	31C83826D01	TERMINAL BOARD 35 female contact terminals
XDS501, 502	9B863168	LAMPHOLDER min. bay.
	NON-REFERE	NCED ITEMS
	61B83678D01 61B83678D02 3A82670A01	LENS, indicator light; RED LENS, indicator light; GRN SCREW, machine; special typ (2 req'd)
	36K858652 36B82869D01 15C82401D01 15D83576D03	KNOB control (2 req'd) (VOL SO KNOB, control (F1-F4) COVER, housing HOUSING, control head
	13D82286C23	ESCUTCHEON, cont. hd.

TRUNK-MOUNT CABLING



NOTES:

- 1. DO NOT USE SLOW-BLOW FUSE.
- PIN NO. 14 IS CONNECTED TO TB501-14 IN CARRIER SQUELCH MOD'ELS AND TO TB501-24 IN "PRIVATE -LINE" MODELS.

EPS-4846-0

PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Trunk Mount Cabling Schematic Diagram Motorola No. 63P81011E58-A 8/20/75-PO REFERENCE SYMBOL

MOTOROLA PART NO.

DESCRIPTION

PARTS LIST

TKN6055A Cable Kit (1-Freq., 12 V)

TKN6056A Ca	ble Kit (1-Freq. ble Kit (2- & Mi	alti-freq., 12 V) EPD-9982-
F401 F402 F403	65-61682 65-475247 65-86099	FUSE, cartridge: 25 amp; 32 v 6-1/4 amp; 32 v 7.5 amp; 32 v
J402	1-80715A24	CONNECTOR, plug: incl: 9-801050 CONNECTOR, plug: 19-cont; female 15-82075D03 HOUSING L. H. 15-82075D01 HOUSING R. H. 3-131758 SCREW, 4-40 x 1-1/8 2 req'd 2-129924 NUT, hex: 4-40 x 1/4"; 2 req'd; 1-80717A73 SCREW & KNOB ASSY. 4-11722 WASHER, "C" 4-800671 WASHER: .016" thick 4-8213D01 WASHER: .032" thick; 42-864148 CLAMP, cable 3-132127 SCREW, tapping:No. 6 x 3/4" plain hex head
W 40 1	1-80744A37	CABLE ASSY, special purpose incl: 30-858553 CABLE, power 1 cond No. 12 ga; RED 22-1/2 ft req'd 29-832116 LUG, for 3/8" stud; ref parts F401 and XF401
W 402	1 -864643	incl: 30-858552 CABLE, power: 1 cond; No. 12 ga; BLK; 5-1/2 ft. req'd 29-832116 LUG, for
W 403	1-80705A19	3/8" stud incl. 29-824456 LUG, for No. 10 stud 37-82603D20 SLEEVE, coded No. 20 29-82602D01 CONNECTOR, plug: 1 cont; ref
W 404	1 - 80744 A 39	part XF402 incl; 29 -865065 LUG, for 3/8" stud 37 -82603D19 SLEEVE, coded No. 19 29 -82602D01 CONNECTOR, plug: 1 cont; ref part XF403
W405	30 -858513 or30 -864650	CABLE, special purpose: 13 cond 17 ft req'd 1-freq 17 cond 17 ft req'd 2- & multi-freq.
XF401		FUSEHOLDER: incl-14-82882A01 BODY 14-82883A01 CAP; 42-82884A01 CLIP, fuse: 2 req'd;
XF402	1-80705A07	41-82885A01 SPRING incl: 14-82882A01 BODY 14-82883A01 CAP 41-82885A01 SPRING 1-80705A08 FUSE CLIF AND LEAD ASSY: incl: 42-82884A01 CLIP, fuse 10-343 LEAD, elect: 1 cond No. 18 ga; ORG; 57" req'd 1-80705A09 FUSE CLIP AND LEAD ASSY: incl. 42-82884A01 CLIP, fuse 30S10310A62 LEAD, elect 1 cond No. 18 ga; ORG; 9"
XF403	1- 80744A38	req'd ref part F402 incl: 14-82882A01 BODY 14-82883A01 CAP 41-82885A01 SPRING 1-80705A11 FUSE CLIP AND LEAD ASSY: incl: 42-82884A01 CLIP, fuse 10-345 LEAD, elect; 1 cond; No. 18 ga; GRN; 97" req'd 1-80705A12 FUSE CLIP AND LEAD ASSY: incl: 42-82884A01 CLIP, fuse 30S10310A62 LEAD elect; 1 cond; No. 18 ga; GRN; 9" req'd ref part F403

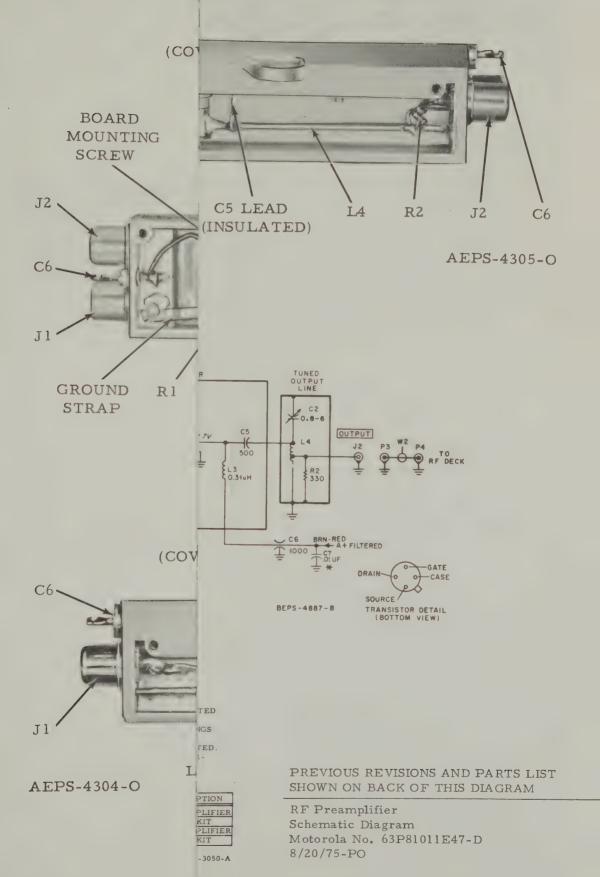
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
---------------------	----------------------	-------------

NON-REFERENCED ITEMS				
29 - 82602D01 37 - 82603D01 37 - 82603D02 37 - 82603D03 37 - 82603D04 37 - 82603D05 37 - 82603D06	CONNECTOR, prug: male; single cont; 19 req'd SLEEVE, coded: 1 2 3 4 5 6			
37 - 82603D07 37 - 82603D08 37 - 82603D09 37 - 82603D10 37 - 82603D11 37 - 82603D12 37 - 82603D13 37 - 82603D14 37 - 82603D15 37 - 82603D16 37 - 82603D17 37 - 82603D18 37 - 82603D21	7 8 9 10 11 12 13 14 15 16 17 18			

NOTE:

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

OUTPUT SIDE COVER PLATE REMOVED)



REFERENCE	MOTOROLA	DESCRIPTION
SYMBOL	PART NO.	DESCRIPTION

PARTS LIST CABLE KIT

TKN6055A Cable Kit (1-Freq., 12 V)
TKN6056A Cable Kit (2- & Multi-freq., 12 V)
EPD-9982-1

TKN6056A	Cable Kit (1-Freq. Cable Kit (2- & Mu	lti-freq., 12 V) EPD-9982-
F401 F402 F403	65-61682 65-475247 65-86099	FUSE, cartridge: 25 amp; 32 v 6-1/4 amp; 32 v 7.5 amp; 32 v
J402	1-80715A24	CONNECTOR, plug: incl: 9-801050 CONNECTOR, plug: 19-cont; female 15-82075D03 HOUSING L. H. 15-82075D01 HOUSING R. H. 3-131758 SCREW, 4-40 x 1-1/8 2 req'd 2-129924 NUT, hex: 4-40 x 1/4"; 2 req'd; 1-80717A73 SCREW & KNOB ASSY. 4-11722 WASHER, "C" 4-800671 WASHER: .016" thick 4-82113D01 WASHER: .032" thick; 42-864148 CLAMP, cable 3-132127 SCREW, tapping:No. 6 x 3/4" plain hex head
W401	1-80744A37	CABLE ASSY, special purpose incl: 30-858553 CABLE, power 1 cond No. 12 ga; RED 22-1/2ft req'd 29-832116 LUG, for 3/8"
W 402	1 -864643	stud; ref parts F401 and XF401 incl: 30-858552 CABLE, power: 1 cond; No. 12 ga; BLK; 5-1/2 ft. req'd 29-832116 LUG, for
W403	1-80705A19	3/8" stud incl. 29-824456 LUG, for No. 10 stud 37-82603D20 SLEEVE, coded No. 20 29-82602D01 CONNECTOR, plug: 1 cont; ref
W 404	1 - 80744A39	part XF402 incl; 29 -865065 LUG, for 3/8" stud 37-82603D19 SLEEVE, coded No. 19 29-82602D01 CONNECTOR, plug: 1 cont; ref part XF403
W405	30-858513 or30-864650	CABLE, special purpose: 13 cond 17 ft req'd 1-freq 17 cond 17 ft req'd 2- & multi-freq. FUSEHOLDER:
XF401		incl-14-82882A01 BODY 14-82883A01 CAP; 42-82884A00 CLIP, fuse: 2 req'd; 41-82885A01 SPRING
XF402	1-80705A07	incl: 14-82882A01 BODY 14-82883A01 CAP 41-82885A01 SPRING 1-80705A08 FUSE CLIF AND LEAD ASSY: incl: 42-82884A01 CLIP, fuse 10-343 LEAD, elect: 1 cond No. 18 ga; ORG; 57" req'd 1-80705A09 FUSE CLIP AND LEAD ASSY: incl. 42-82884A01 CLIP, fuse 30S10310A62 LEAD, elect 1 cond No. 18 ga; ORG; 9"
XF403	1- 80744A38	req'd ref part F402 incl: 14 -82882A01 BODY 14-82883A01 CAP 41 -82885A01 SPRING 1-80705A11 FUSE CLIP AND LEAD ASSY: incl: 42 -82884A01 CLIP, fuse 10-345 LEAD, elect; 1 cond; No. 18 ga; GRN; 97" req'd 1-80705A12 FUSE CLIP AND LEAD ASSY: incl: 42 -82884A01 CLIP,fuse 30S10310A62 LEAD elect; 1 cond; No. 18 ga; GRN; 9" req'd ref part F403

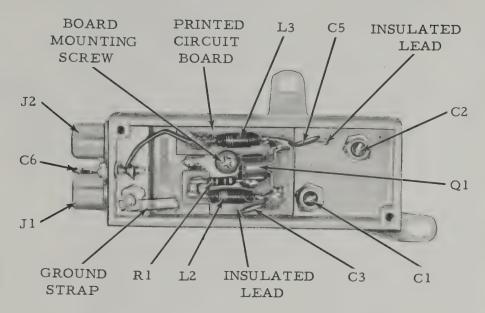
REFERENCE	MOTOROLA	DESCRIPTION
SYMBOL	PART NO.	DESCRIP FION

NON-REFERENCED ITEMS				
NON-REFERE: 29 - 82602D01 37 - 82603D01 37 - 82603D02 37 - 82603D03 37 - 82603D04 37 - 82603D05 37 - 82603D06 37 - 82603D07 37 - 82603D08 37 - 82603D09 37 - 82603D10 37 - 82603D11 37 - 82603D12	NCED ITEMS CONNECTOR, piug: male; single cont; 19 req'd SLEEVE, coded: 1 2 3 4 5 6 7 8 9 10 11			
37 - 82603D13 37 - 82603D14 37 - 82603D15 37 - 82603D16 37 - 82603D17 37 - 82603D18 37 - 82603D21	13 14 15 16 17 18 21			

NOTE:

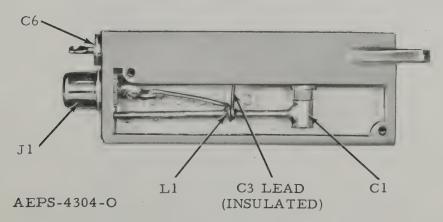
Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

TOP VIEW (COVER PLATE REMOVED)

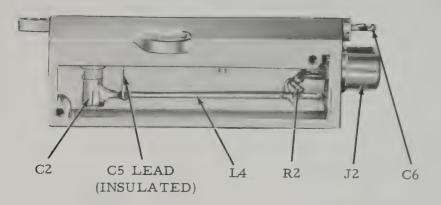


AEPS-4303-O

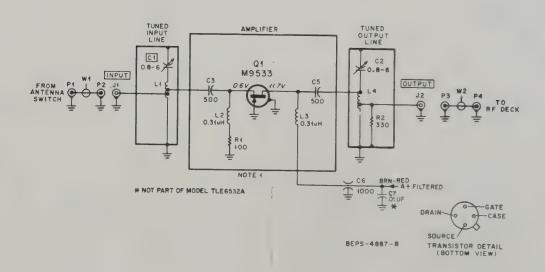
INPUT SIDE (COVER PLATE REMOVED)



OUTPUT SIDE (COVER PLATE REMOVED)



AEPS-4305-0



NOTES:

- ALL COMPONENTS WITHIN THIS BOX ARE PHYSICALLY MOUNTED ON PRINTED CIRCUIT BOARD.
 REFERENCES OUTLINED BY A RECTANGLE INDICATE MARKINGS

- ON CHASSIS.

 3. ALL CAPACITOR VALUES ARE IN pF UNLESS OTHERWISE STATED.

 4. ALL VOLTAGE READINGS MEASURED WITH A 20,000 OHM-PER-VOLT MULTIMETER.

MODEL TABLE

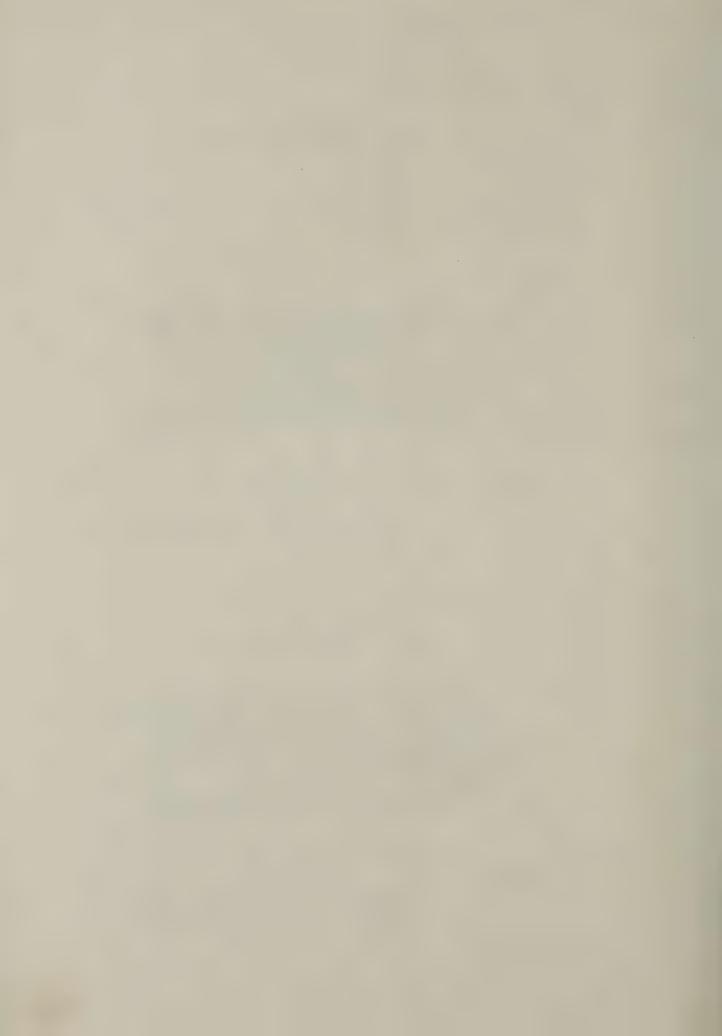
MODEL	SUFFIX	SUB-MODEL	SUFFIX	DESCRIPTION
TLE 1280A		TLE6532A	1	PREAMPLIFIER
(MOBILE)		TLN4182A		CABLE KIT
TLE1290A		TLE6532A	1	PREAMPLIFIER
(BASE)		TLN4372A		CABLE KIT

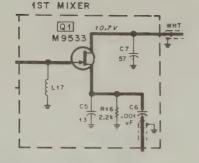
EPS-3050-A

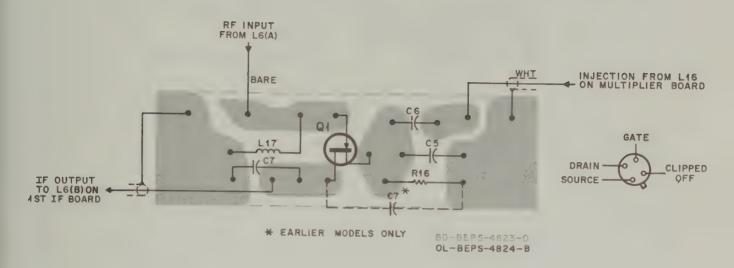
PREVIOUS REVISIONS AND PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

RF Preamplifier Schematic Diagram Motorola No. 63P81011E47-D 8/20/75-PO

57



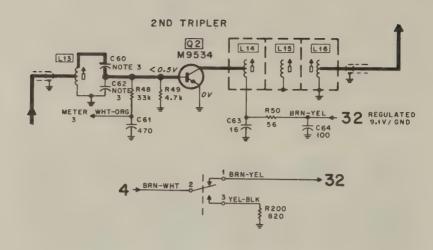


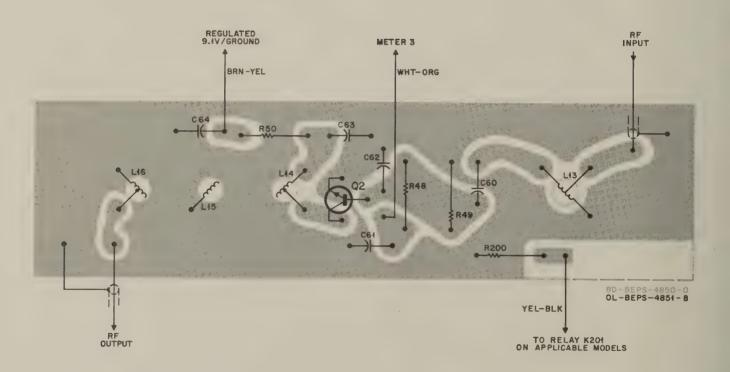


REVISIONS			PEPS-4841-
BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
TLE6583A	C7	WAS 22 pF ±5%; NP0 AND CONNECTED AS SHOWN,	

PARTS LIST & NOTES SHOWN ON TRANSMITTER-RECEIVER SCHEMATIC & INTERCABLING DIAGRAM

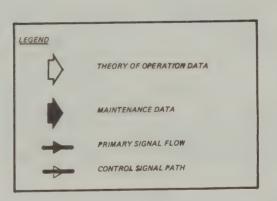
Model TLE6583A RF Deck Circuit Board Detail Motorola No. PEPS-4841-B 8/20/75-PO





PARTS LIST & NOTES SHOWN ON TRANSMITTER-RECEIVER SCHEMATIC & INTERCABLING DIAGRAM

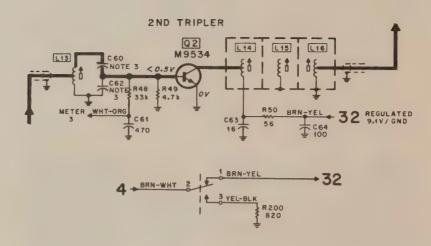
TLE6600A Series Injection Tripler Circuit Board Detail Motorola No. PEPS-4852-B 8/20/75-PO

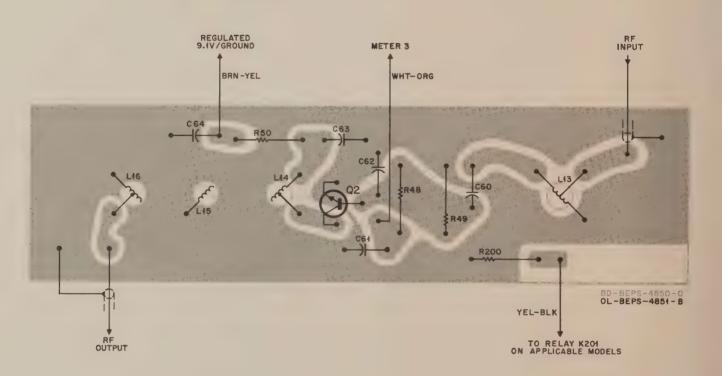


FUNCTION -

Used as a code generator and decoder in "Consolette" Base Stations and "Mocom•70" Mobiles. Generates and decodes 23-bit binary code word in Digital "Private-Line" Squelch Systems.

Models TLN5817A/TLN5817AV "Digital Private-Line" Squelch Encoder-Decoder Schematic Diagram Motorola No. 68P81025E69-B 8/20/75-PO





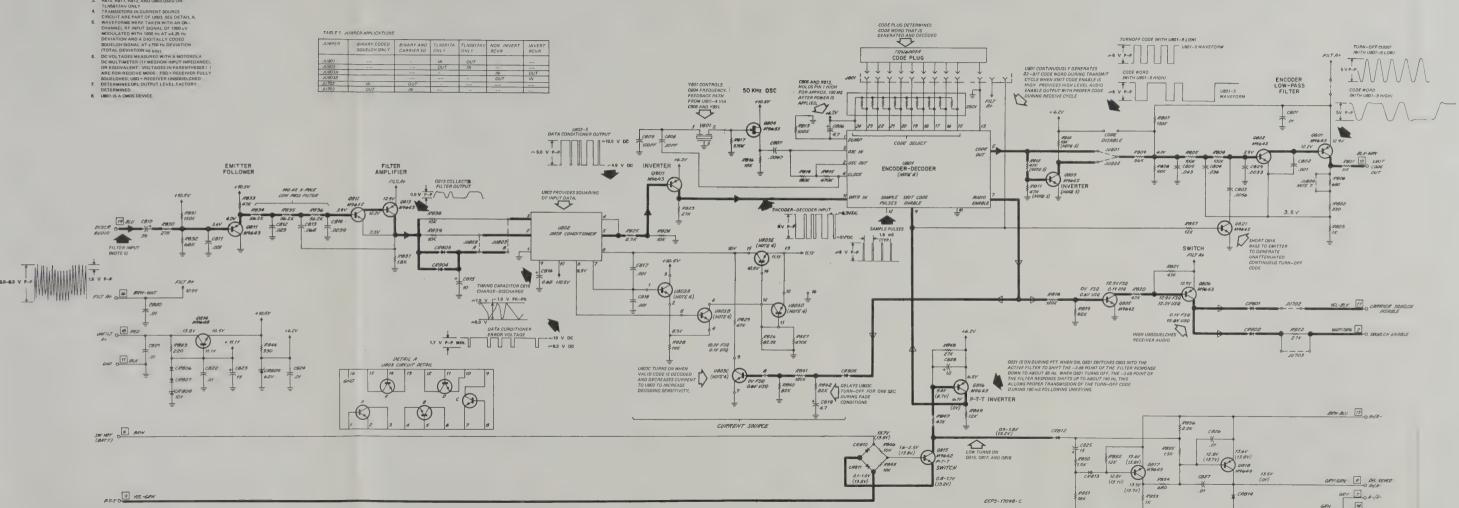
PARTS LIST & NOTES SHOWN ON TRANSMITTER-RECEIVER SCHEMATIC & INTERCABLING DIAGRAM

TLE6600A Series Injection Tripler Circuit Board Detail Motorola No. PEPS-4852-B 8/20/75-PO

- UNLESS OTHERWISE INDICATED
 RESISTOR VALUES ARE IN OHMS
 CARACITOR VALUES ARE IN MICRO
- CAPACITOR VALUES ARE IN MICROFARADS.

 2. SEE TABLE 1 FOR JUMPER APPLICATIONS.

 3. R810, R811, R812, AND Q803 USED ON

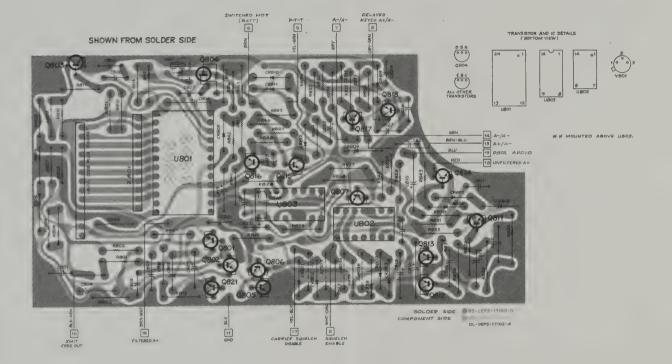




FUNCTION -

Used as a code generator and decoder in "Consolette" Base Stations and "Mocoms-70! Mobiles. Generates and decodes 23-bit binary code word in Digital "Private-Line" Squelch Systems.

Models TLN5817A/TLN5817AV "Digital Private-Line" Squelch Encoder-Decoder Schematic Diagram Motorola No. 68P81025E69-B 8/20/75-PO



	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
--	---------------------	----------------------	-------------

PARTS LIST TLN5817A/TLN5817AV Encoder-Decoder Board PL-3385-A CAPACITOR, fixed: uF ±5%; 50 V unless otherwise stated .01 ±80-20%; 200 V 822, 824, 826, C802,811,817 21-82187B20 .001 ±10%; 100 V C803 8-83813H26 .0056 C804 C805 C806, 819 8-83813H24 .036 8-83213H14 23-84762H07 4.7±20%; 10 V 21-82428B09 .0047±10%; 100 V 21-840849 20 pF; NP0 21-83798B01 100 pF; 200 V 23-82783B36 39 ±10%; 10 V 8-82905G39 8-83813H23 .068 C814 8-83813H19 .0039 23-84762H03 10 ±10%; 20 V C815 C816 23-82783B48 0.68; 35 V C818 21-82187B14 .001 ±10%: 100 V C823,825 23-84538G04 15 ±20%: 20 V C828 23-84538G01 1 ±20%; 35 V 8-83813H27 .0033 C829 DIODE: (SEE NOTE) CR801,802, 48-83654H01 silicon 805, 806, 807, 812,813 CR803, 804 48-84616A01 bot carrier CR808 48-82256C11 Zener type; 10 V 48-83696E07 Zener type; 6.2 V CR809 CR810, 811, 814 48-82466H13 | silicon 9-82071K01 SOCKET: female; 12 contact TRANSISTOR: (SEE NOTE) Q801,806,807, 48-869643 PNP; type M9643 811,813,816, NPN; type M9642 Q802, 805, 812, 48-869642 815, 821 48-869642 Q803 NPN; type M9642 (TLN5817AV 48-869648 Q804 field-effect Q814 48-869648 NPN: type M9648 48-869649 PNP; type M9649 Q818 RESISTOR, fixed: ±5%; 1/4 W; unless otherwise stated 6-124A74 R802.844 6-124A37 R803.853 6-124A49 R804, 805, 808, 6-124A97 R806, 854 6-124A45 R807, 831 6-124B02 6-124A91 R810 10k (TLN5817AV only) 6-124A73 R811.812 6-124A89 47k (TLN5817AV only) R814 6-124B04 R815, 817, 827 6-124B14 6-124A77 R818, 841 6-124C99 120k ±10% R819, 840, 842 6-124C95 R820, 821 6-124C89 R822 6-124C59 82k ±10% 47k ±10% R822 6-124C59 R823, 830, 848 6-124A83 2.7k ±10% R824, 829, 838, 6-124A73 839, 845, 846 6-124A59 2.7k 6-10621D80 56.2k±1%; 1/8 W R826 R829, 833, 847 6-124A89 6-124A93 R834, 835, 836 6-13755D64 56.2k ±1% 6-124A55 R843 6-124A33 R849, 852, 859 6-124C75 12k ±10% R850,855 6-124A53 1.5k 6-124A79 6-124C57 2.2k ±10%

REFERENCE MOTOROLA SYMBOL PART NO.		DESCRIPTION	
		INTEGRATED CIRCUIT:	
		(SEE NOTE)	
U801	51~84267A82	type M6782	
U802	51-84320A55	type LM565CN	
U803	51-84320A79	type CA3096AE	
		NETWORK:	
Z801	51-82142K02	resistive	
	1		
		CRYSTAL:	
¥801	48-82003K01	resonator 50,00000- 50,000000KH	
	1	50.00000KH	
	1		
NO.	ON-REFERENCE	ED ITEMS	
	39-10184A24	CONTACT, chain form	
	37-82603D02	SLEEVING, coded #2	
	37-82603D06	SLEEVING, coded #6	
	37-82603D07	SLEEVING, coded #7	
	37-82603D08	SLEEVING, coded #8	
	37-82603D09	SLEEVING, coded #9	
	37-82603D10	SLEEVING, coded #10	

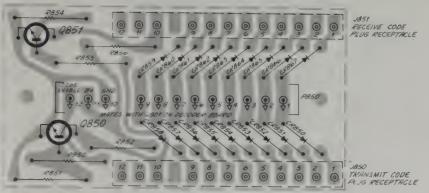
NOTE: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part

37-82603D11 SLEEVING, coded #11

37-82603D13 | SLEEVING, coded #13

37-82603D14 SLEEVING, coded #14 37-82603D16 SLEEVING, coded #16 37-82603D17 SLEEVING, coded #17 37-82603D18 SLEEVING, coded #18

37-82603D19 SLEEVING, coded #19



SHOWN FROM COMPONENT SIDE

COMPONENT SIDE 9 40 CEPS- 17620 0

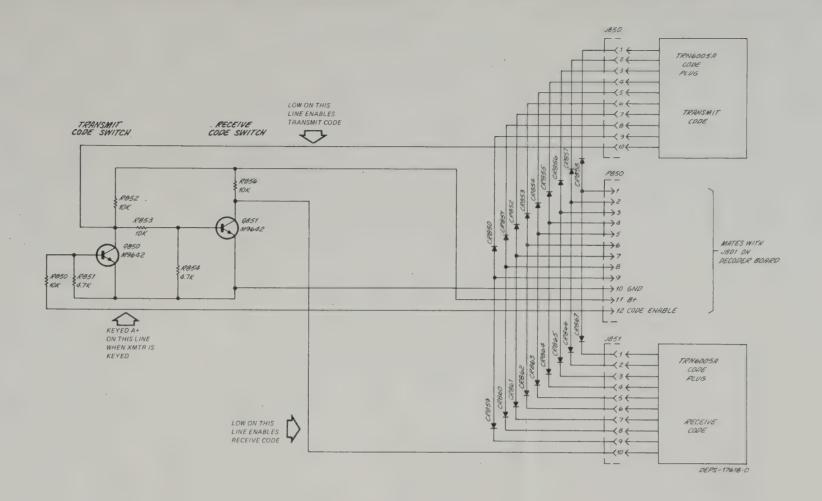
OL-CEPS-17621-0

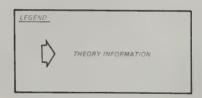
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

PARTS LIST

TLN5730A 2-Code Adapter Board PL-3414-0 DIODE: (SEE NOTE) CR850 thru 867 48-83654H01 CONNECTOR, receptacle: female; 12-contact J850, 851 9-82071K01 CONNECTOR, plug: consists of: 28-82070K01 P850 CONTACT, male; 13 req'd. TRANSISTOR: (SEE NOTE)
NPN; type M9642 Q850, 851 48-869642 RESISTOR, fixed: 10k ±5%; 1/4 W R850, 852, -124A73 853, 856 R851, 854 6-124A65 4.7k ±5%; 1/4 W NON-REFERENCED ITEMS CIRCUIT BOARD ASSY., incl. 1V80769B88 referenced item P850 SCREW, machine: 4-40 x 5/16'; 3-138804 2 req'd.

NOTE: For optimum performance, diodes and transistors must be ordered by Motorola part number.



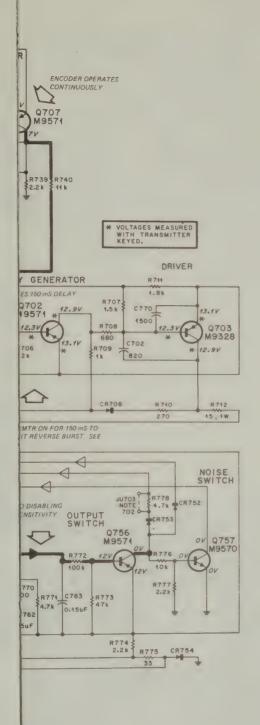


APPLICATION -

Plugs into code plug receptacle on "Digital Private-Line" Decoder or Encoder-Decoder to allow separate digital "Private-Line" codes for transmit and receive. Code plugs for the two codes then plug into the receptacles on the two-code adapter board.

Model TLN5730A "Digital Private-Line" Two-Code Adapter Schematic Diagram and Circuit Board Detail Motorola No. 68P81106E97-A 8/20/75-PO

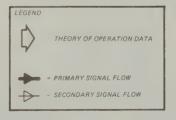




NOTES: 701. DETERMINES TONE OUTPUT LEVEL: FACTORY DETERMINED.

701. DETERMINES TONE OUTPUT LEVEL: FACTORY DETERMINED.
702. THE RADIO IS SHIPPED WITH JUMPER JUTO2 OUT AND JUTO3 IN. IN THIS MODE THE "PL"
SQUELCH SENSITIVITY IS TIED TO THE CARRIER SQUELCH SENSITIVITY. THUS THE
"PL" SQUELCH SENSITIVITY IS VARIABLE WITH SQUELCH CONTROL. IF DESIRED, THE
RADIO CAN BE WIRED SO THE "PL" SQUELCH SENSITIVITY, SINDEPENDENT OF CARRIER
SQUELCH CONTROL. TO ACCOMPLISH THIS, INSERT JUMPER JUTO2 AND REMOVE

JUMPER JUTOS.
703. UNLESS OTHERWISE STATED, ALL CAPACITOR VALUES ARE IN PICOFARADS, RESISTOR VALUES ARE IN OHMS, ALL RESISTORS ARE 1/4 WATT.
704. DC VOLTAGES TAKEN WITH 20K OHMS PER VOLT MULTIMETER WITH RESPECT TO

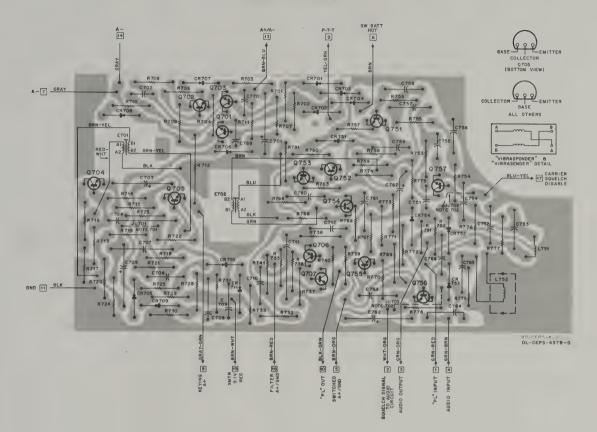


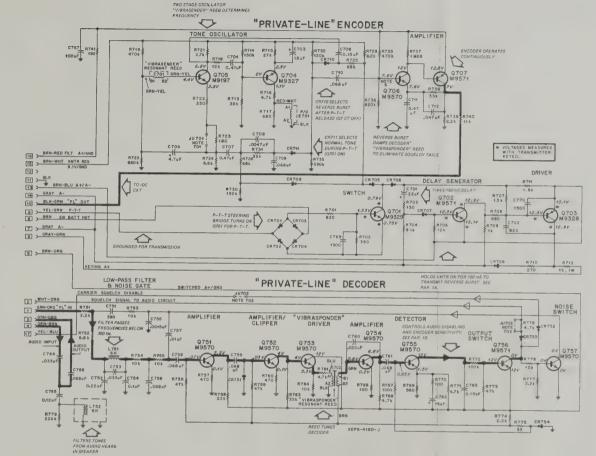
PARTS LIST & NOTES SHOWN ON TRANSMITTER-RECEIVER SCHEMATIC & INTERCABLING DIAGRAM

TLN4448A-2 "Private-Line" Encoder & Decoder Circuit Board Detail Motorola No. PEPS-4849-F 8/20/75-PO



"PL" ENCODER-DECODER





REVISIONS	PEPS-4849-1
-----------	-------------

CHASSIS AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
TLN4448A-1	C751	FROM 270 pF TO	A4
		FROM 680 Ohms TO 550 Ohms	B3
TLN4448A-2		FROM 23-84762H03 10 uF TO 23-84762H16 ZZ uF	AZ
		FROM 6-124A80 R20 (thms TO 6-124A72 9, lkOhms	

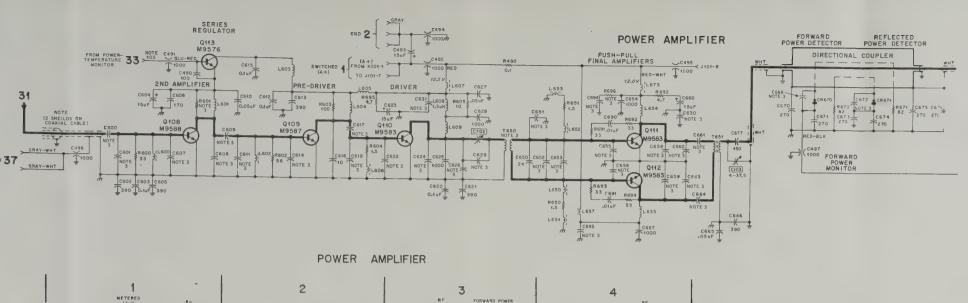
NOTES
TO LETERMINES TOME OUTPUT LEVEL FACTORY DETERMINED
TO THE RADIO IS SHIPPED WITH JUMPER JUTQS OUT AND JUTQS IN INTHIS MODE THE "PL"
SOUELCH SENSITIVITY IS TIED TO THE CARRIER SOUELCH SENSITIVITY. THUS THE
"PL" SOUELCH SENSITIVITY IS VARIABLE WITH SOUELCH CONTROL. IF DESIRED THE "PL'SOURCON SENSITIVITY IS VARIABLE WITH SOURCEM CONTROL. IN DESIRED THE RADIO CAME BE WINED SO THE "PL'SOURCEM SENSITIVITY IS INDEPENDENT OF CARRIER SOURCEM CONTROL. TO ACCOMPLISH THIS INSERT JUMPA JUNDO AND REMOVE JUMPA PLUNDES STATED, ALL CAPACITOR VALUES ARE IN PICCOFARADS. REJISTOR VALUES ARE IN PICCOFARADS. REJISTOR VALUES ARE IN PICCOFARADS. REJISTOR VALUES ARE WOMEN ALL RESISTORS ARE IN WART.

704 DC VOLTAGES TAKEN WITH JON OWNS PER VOLT MULTIMETER WITH RESPECT TO GROUND.



PARTS LIST & NOTES SHOWN ON SCHEMATIC & INTERCABLING DIAGRAM

TLN4448A-2 "Private-Line" Encoder & Decoder Circuit Board Detail Motorola No. PEPS-4849-F 8/20/75-PO



A PROPERTY OF THE PROPERTY OF

SOLDER SIDE BD.-DEPS-9145-0
COMPONENT SIDE \$ \$0.-DEPS-9147-D

OL DEPS-9147-D

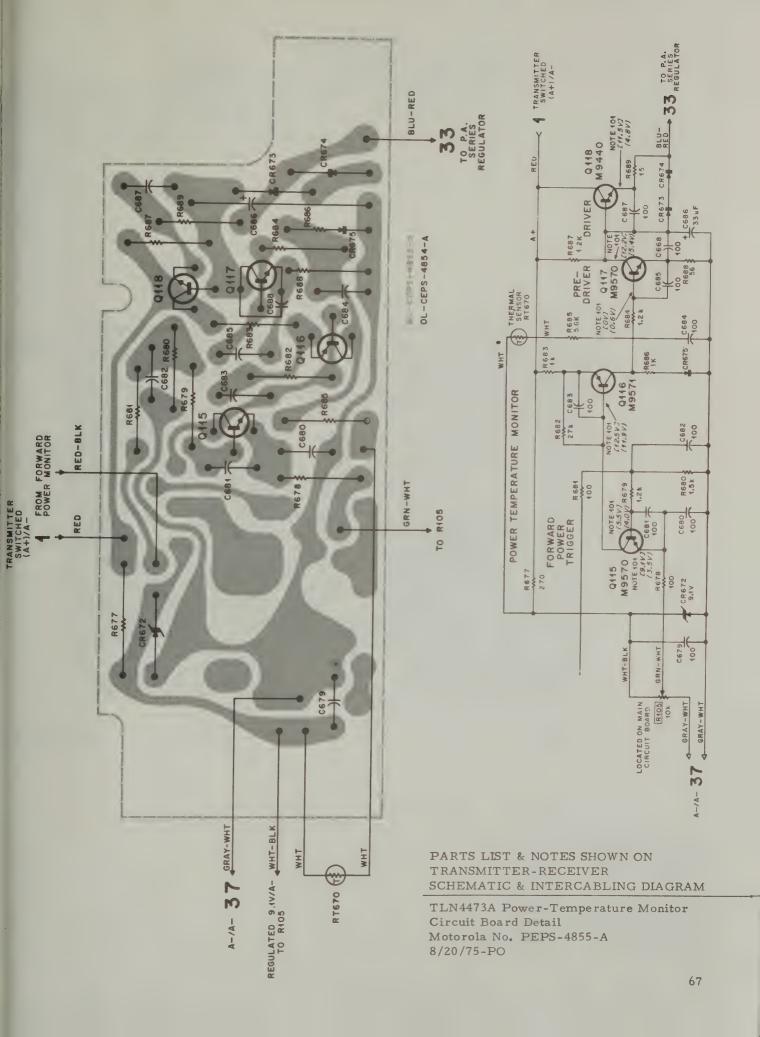
C628, C654 AND C657 ARE STAND-OFF CAPACITORS

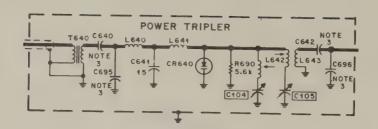
WHEN MOUNTING TRANSISTORS, DO NOT OVERTIGHTEN (BEYOND 5-7 INCH-POUNDS) DAMAGE TO TRANSISTOR MAY RESULT IF THIS SPECIFICATION IS EXCEEDED.

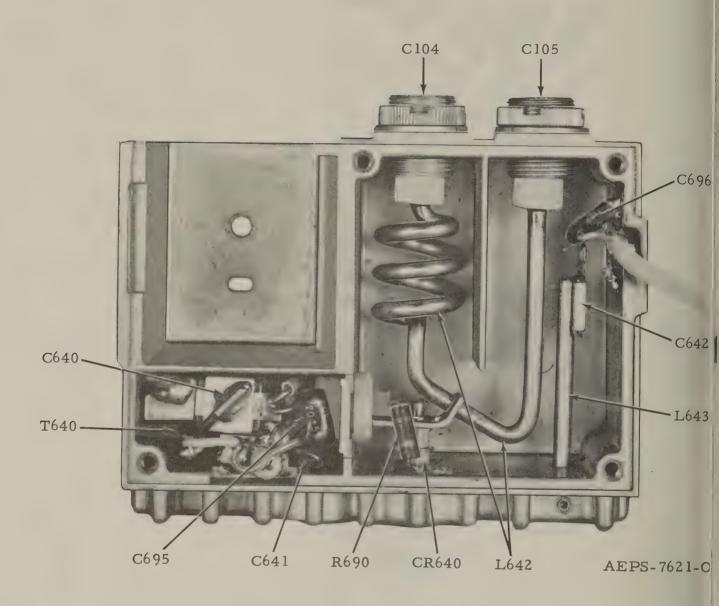
PARTS LIST & NOTES SHOWN ON TRANSMITTER-RECEIVER SCHEMATIC & INTERCABLING DIAGRAM

Model TLE1550A Series Power Amplifier Circuit Board Detail Motorola No. PEPS-9181-E 8/20/75-PO

REF.	KEY	REF.	KEY
SYM.	NO.	SYM.	NO.
DIIV.	1 110.	DIW.	110.
C102	B2	C670	A2
C103	Al	C671	A2
1			
C490	B4	C672	A3
C600	A4	C673	A3
C601	A4	C674	A2
C602	A4	C675	A2
C603	B4	C676	A3
		C677	Al
C604	B3		
C605	B4	C688	A2
C606	B4	C690	Bl
		C691	Al
C607	A4	C693	Al
1		C694	Bl
C608	B4		
C609	A3	CR670	A2
C610	B3	CR671	A3
C611	A3	L600	B4
C6 12	B3	L601	B3
	1		
C613	B3	L602	A3
C6 14	A3	L603	B4
C615	B4	L604	B3
C6 16	B3	L605	B3
C010	1 22	L606	В3
C617	B3	L607	B2
C6 18	A3	L608	B2
C620	A2	L609	AZ
C621	A2	L650	A2
		L651	A2
C622	B2		
C623	B2	L652	Bl
C624	B2	L653	Bl
C625	A2	L654	B1
C626		L657	Al
	B2	L673	Bl
C627	B2	Q108	B4
		1	
C628	A2	Q109	B3
C629	B2	Q110	B2
		Q111	Bl
C630	Bl	Q112	Al
C631	B2	Q113	B4
C650	B2		
C651	В2	R600	A4
C652	Bl	R601	B4
		R602	В3
C653	Bl	R604	В3
C654	Bl	R605	B2
C655	Bl	R650	
C656	Al		A2
C657		R651	Bl
	A1	R670	A2
C658	Bl	R671	A3
C659	A1	R691	B1
C660	Bl	R692	Bl
C661	B1		
C662		R693	Al
	B1	R694	Al
C663	Al	R695	B2
C664	A1	R696	Bl
	B1	T650	B2
C665			
C665 C666	Al	T651	Al

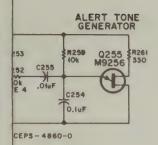






PARTS LIST SHOWN ON TRANSMITTER-RECEIVER SCHEMATIC & INTERCABLING DIAGRAM

TLE6570A Series Power Tripler Parts Location Detail Motorola No. PEPS-4866-A 8/20/75-PO

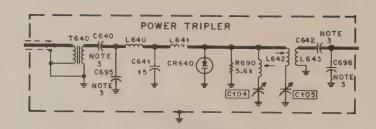


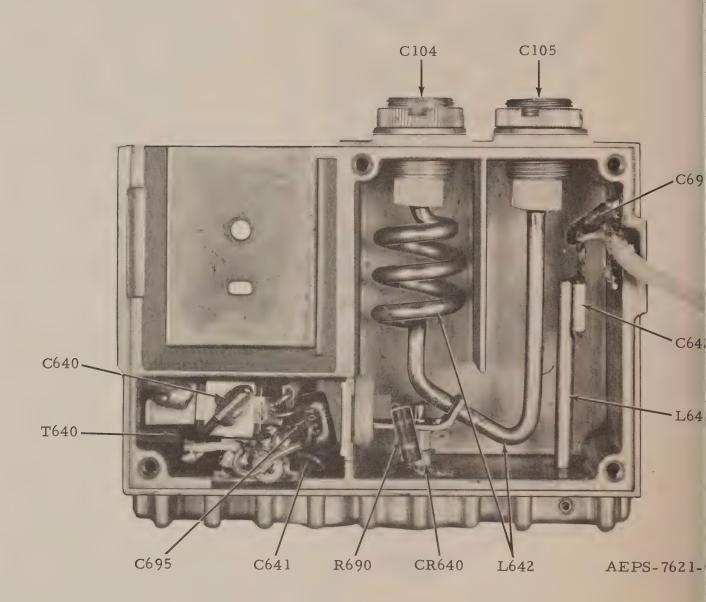
	SPEAKER OUTPUT VARIATIONS
R252 VALUE	IN dB
4 /1	+10.1
56k	+ 8.4
68k	+ 7.2
1001	, 2.8
	Secretare (100 m.V)
270k	2. 9
	- 1
470k	- / Š
1.30K	-13.3

TLN109	TI.N4323A T-O-	
TLN8403A T-O-T BOARD	TLN8404 COMPONENTS KIT	ADAPTER KIT

EPS-4863-0

Time-Out Timer & Adapter Kit Schematic Diagram & Circuit Board Detail Motorola No. 63P81011E48-O 8/20/75-PO





PARTS LIST SHOWN ON TRANSMITTER-RECEIVER SCHEMATIC & INTERCABLING DIAGRAM

TLE6570A Series Power Tripler Parts Location Detail Motorola No. PEPS-4866-A 8/20/75-PO

IMPORTANT

USE ONLY THE FOLLOWING MOTOROLA

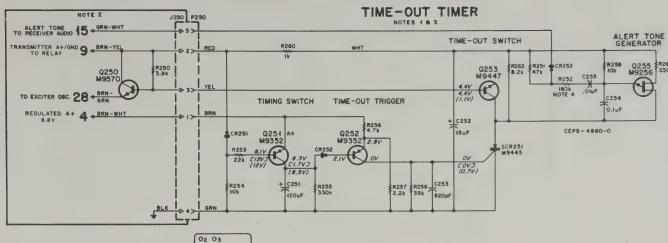
PART NUMBERS WHEN ORDERING REPLACEMENT PARTS

TLN1097A Time-Out Timer PL-1118-			
		CAPACITOR, fixed: uF ±10%;	
		unl. stated	
C251	23D83185D01	120; 15 V	
C252	23D83214C02	15 ±20%: 25 V	
C253	21C82187B17	820 pF; 500 V	
C254	8D83293B01	0.1:50 V	
C255	21D82428B59	.01 ±20%; 200 V	
		SEMICONDUCTOR DEVICE,	
		diode: (SEE NOTE)	
CR251	48C82392B03	silicon	
CR252	48C82392B09	silicon	
CR253	48C82392B03	silicon «	
		TRANSISTOR: (SEE NOTE)	
Q251	48R869352	P-N-P; type M9352	
Q252	48R869352	P-N-P; type M9352	
Q253	48R869447	N-P-N; type M9447	
Q255	48R869256	unijunction; type M9256	
		RESISTOR, fixed: ±10%; 1/4 W;	
		unl. stated	
R251	65128902	47K	
R252	6S129229	180K	
R253	6S128685	22K	
R254	6S129225	10K	
R255	6S129473	330K ±5%	
R256	6S129669	4.7K ±5%	
R257	6K129804	2.2K ±5%	
R258	6K128903	39K	
R259	6S129225	10K	
R260	6S127802	1K	
R261 ·	65129775	330	
R262	65128686	8.2K	
		RECTIFIER, control:	
SCR251	58R869445	type M9445	
	NON-REFERE	enced itèms	
	1 V80763A66 TLN8403A	SOCKET ASSY. timer board CIRCUIT BOARD ASSEMBLY; does not include CR253, R252	

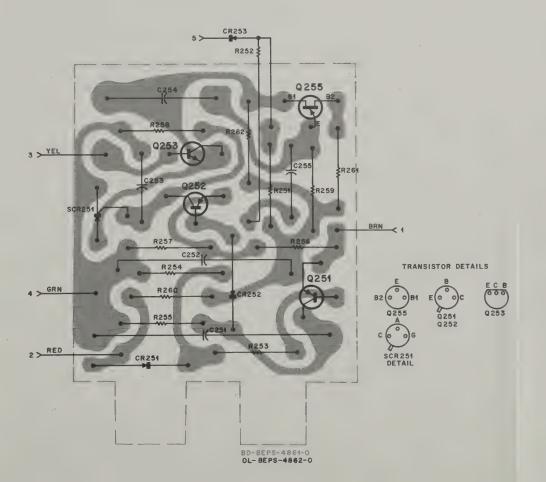
TLN4323A Installation Kit		PL-1021-O		
Q250	48R869570	TRANSISTOR; (SEE NOTE) N-P-N; type M9570		
R250	6S129232	RESISTOR, fixed: 3.9k ±10%; 1/4 W		
NON-REFERENCED ITEMS				
	1 V80708B80 41A82114E01 3S134184	CIRCUIT BOARD ASSY. SPRING, crystal hold-down SCREW, tapping: No. 4-40 x 5/16"		

NOTE:

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.







NOTES:

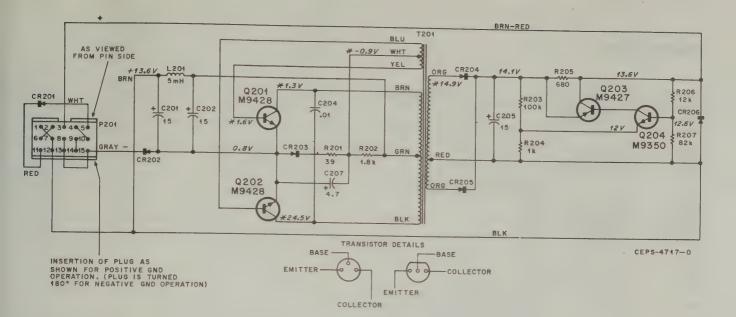
- 1. VOLTAGE READING CONDITIONS, [] = TRANSMITTER KEYED READING.
- 1. VOLTAGE READING CONDITIONS, []: = TRANSMITTER KEYED READING.
 2. TIME-OUT TIMER AND CONNECTIONS ARE OPTIONAL. Q250, R252, AND J250 ARE NOT SUPPLIED UNLESS UNIT IS FACTORY EQUIPPED WITH TIME-OUT TIMER.
 3. A COMPONENT (CR104) IS OMITTED FROM TRANSMITTER IN UNITS EQUIPPED WITH TIME-OUT TIMER.
 4. DECREASE VALUE OF R252 TO INCREASE VOLUME OF OUTPUT ALERT TONE.

R252 VALUE	SPEAKER OUTPUT VARIATIONS IN dB
4-	01
* 1 9	- 2 4
1 5.0	
.2 ×	2 -
, " y	Reference (1 p V
270k	- 2 -
330k	- 6
470k	9 :
680k	3 -

TLN1097A T		TLN4323A T-O-T
TLN8403A T-O-T BOARD	1. 1 CM10 ENIS	ADAPTER KIT

Time-Out Timer & Adapter Kit Schematic Diagram & Circuit Board Detail Motorola No. 63P81011E48-0 8/20/75-PO



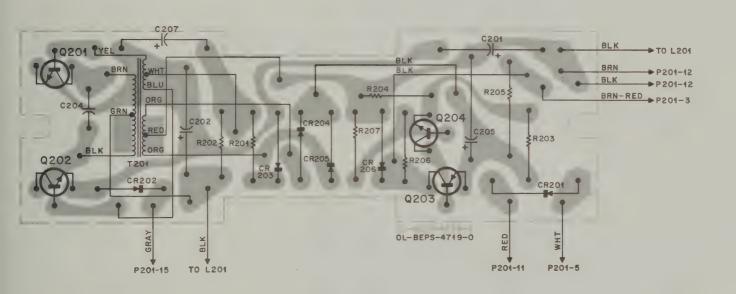


NOTES

- ALL RESISTANCES ARE IN OHMS, ±10%. ALL CAPACITANCES ARE IN MICROFARADS.
 CHOKE L201 IS NOT MOUNTED ON THE PRINTED CIRCUIT BOARD.
- CHOKE L201 IS NOT MOUNTED ON THE PRINTED CIRCUIT BOARD,
 ALL PRIMARY CIRCUIT VOLTAGES ARE MEASURED WITH RESPECT
- 4. ALL SECONDARY CIRCUIT VOLTAGES ARE MEASURED WITH RE-
- SPECT TO PIN 12.

 VOLTAGES MARKED WITH AN ASTERISK (*) ARE MEASURED WITH AN OSCILLOSCOPE.
- 6. SEE PARTS LIST FOR RESISTOR WATTAGE RATINGS.

EPD-14784-A



PARTS LIST SHOWN ON BACK OF THIS DIAGRAM

Model TLN8482A Ground Reversing Kit Schematic Diagram and Circuit Board Detail Motorola No. 63P81011E49-O 8/20/75-PO

TLN8482A Ground Reversing Kit

EPD-14846-D

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C201, 202, 205 C204 C207	23K865136 21D82428B40 23K865137	CAPACITOR, fixed: uF 15 ±20%; 25 V .01 +60-40%; 250 V 4.7 ±20%; 25 V SEMICONDUCTOR DEVICE,
CR201 CR202 CR204, 205 CR203, 206	48C 82525G07 48C 82466H01 48C 82466H12 48C 82392B03	diode: (SEE NOTE) silicon silicon silicon silicon
L201	25B82142H01	COIL, audio: choke 5 mH
P201	1V80735A23	CONNECTOR, plug: ass'y; male; 15 contact; includes 14C82141H01 INSULATOR, 29C82335A01 TERMINAL
Q201, 202 Q203 Q204	48R869428 48R869427 48R869350	TRANSISTOR: (SEE NOTE) N-P-N; type M9428 P-N-P; type M9427 N-P-N; type M9350
R201 R202 R203 R204 R205 R206 R207	6S131652 6S129269 6S129226 6K127802 6S6040 6S129230 6S129145	RESISTOR, fixed: ±10%; 1/4 W; unl. stated 39 1.8K 100K 1K 680; 1/2 W 12K 82K
T201	25D83633D01	TRANSFORMER: pri. No. 1: BLU, YEL w/center tap @ WHT; total coil res087 ohms pri. No. 2: BRN, BLK w/center tap @ GRN; total coil res. 0.16 ohms sec: ORG, ORG w/center tap @ RED; total coil res. 0.339

NOTE:

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

TABLE I.

"PRIVATE-LINE" ENCODER MEASUREMENTS

METERING POINT	TYPICAL AUDIO VOLTAGES
Tone Oscillator, Q704, Base	180 mV rms
Tone Oscillator, Q704, Collector	1.2 V rms
Across Reed Primary, Bl to B2	60 mV rms
Across Reed Secondary, Al to A2	100 mV rms
Tone Oscillator, Q705, Base	0.85 V rms
Tone Oscillator, Q705, Collector	0.4 V rms
Tone Oscillator, Q705, Emitter	0.85 V rms
PL Amplifier, Q706, Base	. 35 V rms
PL Amplifier, Q706, Emitter	. 35 V rms
PL Amplifier, Q706, Collector	25 mV rms
PL Amplifier, Q707, Collector	3.2 V rms
PL Tone Output (BLK-GRN WIRE)	0,60 V rms

- Readings may be taken <u>without</u> keying transmitter. All readings taken with Motorola AC Voltmeter are referenced to chassis.

EPS-4792-0

TABLE II.

"PRIVATE-LINE" DECODER MEASUREMENTS

METERING POINT	TYPICAL READING*
Decoder Board Input (GRAY-GRN lead)	60 mV rms
PL Amplifier, Base (Q751)	10 mV rms
PL Amplifier, Collector (Q751)	220 mV rms
Amplifier/Clipper, Base (Q752)	2.8 V rms
Amplifier/Clipper, Collector (Q752)	2.8 V rms
"Vibrasponder" Driver, Base (Q753)	540 mV rms
"Vibrasponder" Driver, Emitter (Q753)	500 mV rms
Amplifier, Base (Q754)	100 mV rms
Amplifier, Collector (Q754)	2 0 V rms
Detector, Base (Q755)	1.8 V rms
Detector, Collector (Q755)	2.7 V ds
Output Switch, Base (Q756)	11.4 V dc
Output Switch, Collector (Q756)	11,9 V dc
Noise Switch, Base (Q757)	0.7 V dc

EPS-4793-A

TABLE III.

TRANSMITTER AUDIO AND RF VOLTAGE READINGS

	TYPICAL VOLTAGE READINGS (rms)		
METERING POINT	Emitter	Base	Collector
Audio Amplifier (Q101) Note 1	40 m.V	40 mV	180 mV
Clipper (Q102) Note 1		7.6 mV	1.3 V
Emitter Follower (Q103) Note 1	1.1 V		
Oscillator(s) (Q104, Q119, Q120, Q121)			1.7 V
Buffer (Q105)		0.9 V	4.0 V
Tripler (Q106)		3. U V	5.3 V
lst Amplifier (Q107)		1.5 V	9.0 V
2nd Amplifier (Q108)		3.5 V	5.0 V
Pre-Driver (Q109)		2.5 V	9.0 V
Driver (Q110)		6.0 V	12.0 V
Final Amplifiers (Q111, Q112)		8.0 V	14.0 V

- Audio readings are taken with 0.1 V rms of 1000-Hz tone applied at the microphone connector.

 All voltages measured with respect to chassis ground.

 Supply voltage = 13.6 V dc.

TABLE IV.

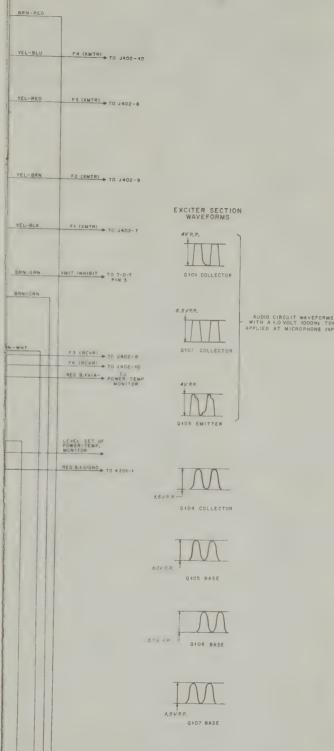
TYPICAL RECEIVER GAIN DISTRIBUTION

METERING POINT	RF VOLTAGE AT ANTENNA CONNECTOR	NOMINAL RF V AT METERII POINT
1st Mixer Drain (Q1)	25 mV	0.50 V
11.7 MHz IF Base (Q5)	25 mV	. 23 V
Il. 7 MHz IF Collector (Q5)	25 mV	0.30 V
2nd Mixer Base (Q6)	25 mV	0.12 V
2nd Mixer Collector (Q6)	1 mV	0.25 V

- All voltages referenced to chassis ground.
 DC Supply Voltage = 13.8 V dc
 All voltages measured with Motorola Model S1052B DC Multimeter using th

EPS-4

SLN6055A RF Probe.
Multiply all voltages by 2 when preamplifier is used.



B-Suffix Main Board Models Circuit Board Detail Motorola No. PEPS-16936-A 8/20/75-PO

TLN8482A Ground Reversing Kit

EPD-14846-D

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C201, 202, 205 C204 C207	23K865136 21D82428B40 23K865137	CAPACITOR, fixed: uF 15 ±20%; 25 V .01 +60-40%; 250 V 4.7 ±20%; 25 V SEMICONDUCTOR DEVICE,
CR201 CR202 CR204, 205 CR203, 206	48C 82525G07 48C 82466H01 48C 82466H12 48C 82392B03	diode: (SEE NOTE) silicon silicon silicon silicon
L201	25B82142H01	COIL, audio: choke 5 mH
P201	1V80735A23	CONNECTOR, plug: ass'y; male; 15 contact; includes 14C82141H01 INSULATOR, 29C82335A01 TERMINAL
Q201, 202 Q203 Q204	48R869428 48R869427 48R869350	TRANSISTOR: (SEE NOTE) N-P-N; type M9428 P-N-P; type M9427 N-P-N; type M9350
R201 R202 R203 R204 R205 R206 R207	6S131652 6S129269 6S129226 6K129226 6K127802 6S6040 6S129230 6S129145	RESISTOR, fixed: ±10%; 1/4 W; unl. stated 39 1.8K 100K 1K 680; 1/2 W 12K 82K
T201	25D83633D01	TRANSFORMER: pri. No. 1: BLU, YEL w/center tap @ WHT; total coil res087 ohms pri. No. 2: BRN, BLK w/center tap @ GRN; total coil res. 0.16 ohms sec: ORG, ORG w/center tap @ RED; total coil res. 0.339

NOTE:

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.

TABLE L

"PRIVATE-LINE" ENCODER MEASUREMENTS

METERING POINT	TYPICAL AUDIO VOLTAGE
Tone Oscillaror, Q704, Base	18. n.\ rms
Tone Oscillator, Q704, Collector	1,2 V rms
Across Reed Primary, Bl to B2	60 mV rms
Across Reed Secondary, Al to A2	100 mV rms
Inne Oscillator, C70s, Base	0.85 V rms
Time Chatter, Chin. Till for	4 \ rms
The as mister, with Empiter	0.85 V rms
L. Amplifier, Q706, Base	. 35 V rms
PL Amplifier, Q706, Emitter	, 35 V rms
PL Amplifier, Q706, Collector	25 mV rms
PL Amplifier, Q707, Collector	3, 2 V rms
PL Tone Output (BLK-GRN WIRE)	0,60 V rms

Readings may be taken without keying transmitter.
 All readings taken with Motorola AC Voltmeter are referenced to

"PRIVATE-LINE" DECODER MEASUREMENTS

METERING POINT	TYPICAL READING
" ter Board Input (CDAY GPN lead)	+^ m' rms
PL Amplifier, Base (Q751)	10 mV rms
PL Amplifier, Collector (Q751)	220 mV rms
Amplifier/Clipper, Base (Q752)	2.8 V rms
Amplifier/Clipper, Collector (Q752)	2,8 V rms
'Vibrasponder' Driver, Base (Q753)	540 mV rms
Vibrasponder" Driver, Emitter (Q753)	500 mV rms
Amplifier, Base (Q754)	100 mV rms
Amplifier, Collector (Q754)	2.0 V rms
Detector, Base (Q755)	1.8 V rms
Detector, Collector (Q755)	2,7 V dc
Jutput Switch, Base (Q756)	11.4 V dc
Output Switch, Collector (Q756)	11,9 V dc
Noise Switch, Base (Q757)	0.7 V dc

EPS-4793-A

TRANSMITTER AUDIO AND RF VOLTAGE READINGS

	TYPICAL VOLTAGE READINGS (rms)			
METERING POINT	Emitter	Base	Collector	
Audio Amplifier (Q101) Note 1	1 1	4 mV	180 mV	
Clipper (Q102) Note 1		7.6 mV	1.3 V	
Emitter Follower (Q103) Note 1	1.1 V			
Oscillator(s) (Q104, Q119, Q120, Q121,	-		1 7 V	
Suffer (Q105)		0.8 V	4.0 V	
ripler (Q106)		3.0 V	5.3 V	
.st Amplifier (Q107)		1.5 V	9.0 V	
.nd Amplifier (Q108)		3.5 V	5.0 V	
re-Driver (Q109)		2.5 V	9.0 V	
river (Q110)		6.0 V	12.0 V	
Final Amplifiers (Q111, Q112)		8.0 V	14.0 V	
TES-				

Audio readings are taken with 0. l V rms of 1000-Hz tone applied at the

TYPICAL RECEIVER GAIN DISTRIBUTION

METERN S POINT	RF VOLTAGE AT ANDEN A ON ECTOP	AT METERING POINT	
Mixer Drain 4.	31 - 7	5 FC %	
T MS z IF Bass Q:	25 m.V	. 63 €	
" Mirz II . tow t r Qf		5. 31 V	
Miler Base Q	25 m.V	5, 12 5	
Water Conect r Q	, п.:	0 25 V	

All voltages referenced to chassis ground.

All votages retreated of Lassus ground.
DC Supply Voltage = 13.8 V de
All voltages measured with Motorola Model S1052B DC Multimeter using the
SLN6055A RF Probe.

Multiply all voltages by 2 when preamplifier is used.

TABLE V.

TYPICAL RECEIVER GAIN DISTRIBUTION

METERING POINT	RF VOLTAGE AT ANTENNA CONNECTOR	NOMINAL RF VOLTAGE AT METERING POINT	
1st 455 kHz IF Amp. Base (Q301)	2 mV	0.11 V	
1st 455 kHz IF Amp. Coll. (Q301)	1 mV	2.5 V	
NOTES.			

All voltages referenced to chassis ground.

Supply Voltage = 13.8 V dc
All voltages measured with Motorola Solid-State dc multimeter with rf probe.

EPS-4796-0

TABLE VI.

LIMITER NOISE VOLTAGES WITH NO CARRIER SIGNA

NOMINAL VOLTAGES (rms)
1, 1 y
1.35 V
1,2 V
4.8 ·V
a Model S1052B DC Multimete

EPS-4797-0

TABLE VII.

TYPICAL AUDIO NOISE VOLTAGES WITH NO CARRIER SIGNAL

CIRCUIT METERED	TYPICAL READING
Discriminator Output (Collector of Q308)	1.5 V rms
Emitter Follower Output (Emitter of Q309)	0,53 V rms
Base of 1st Audio Amplifier (Q340)	9 mV rms
Collector of 1st Audio Amphifier (Q340)	0.25 V rms
Base of Audio Driver (Q341)	80 mV
Base of Audio Driver (Q342)	40 mV
Collectors of Audio Drivers (Q341, Q342)	2.7 V rms
Bases of Audio Finals (Q343, Q344)	0.50 V rms
Collectors of Audio Finals (Q343, Q344)	6,6 V rms
Audio output into 3.2 Speaker	3.7 V rms
NOTES:	
 All readings referenced to chassis. 	
2 All voltages measured with Motorola Mo	del S1053C AC Voltme
2 1/07 773 473	

EPS-4798-0

TABLE VIII.

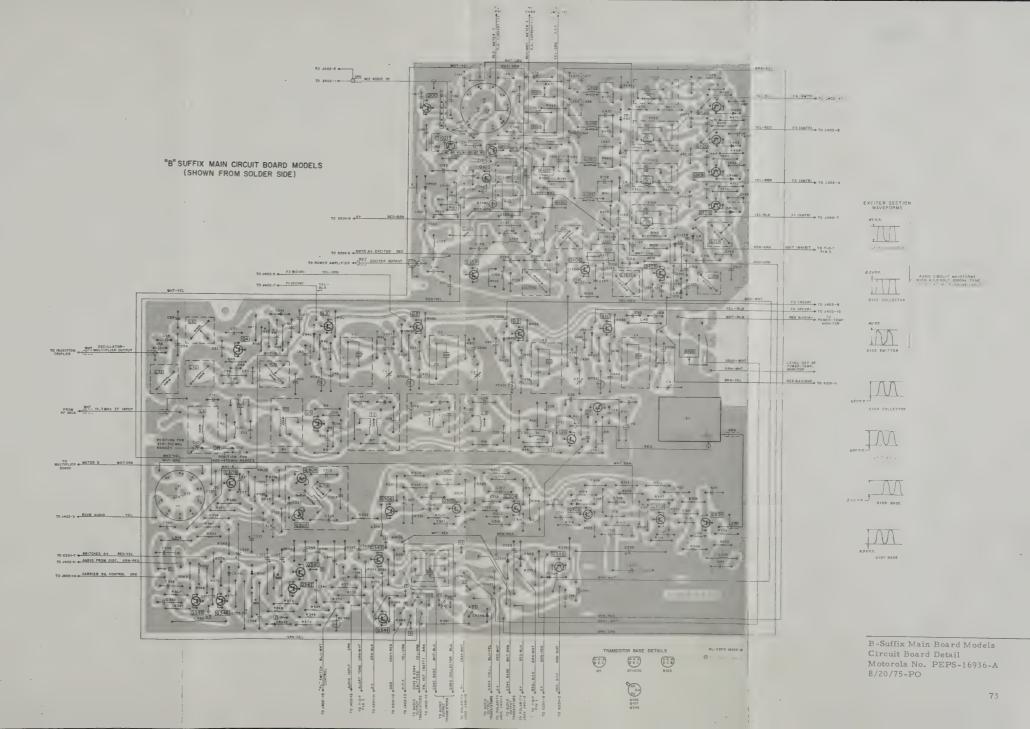
CARRIER SQUELCH NOISE VOLTAGE MEASUREMENTS

fully counterclockwise; PL switch OFF.

DC Supply Voltage = 13.8 V dc.

CIRCUIT METERED	TYPICAL READIN
Squelch Limiter, Base (Q345)	0.32 V rms
Sque,ch Limster, Collector (Q345)	3.5 V rms
Squelch Detector, Base (Q346)	0.40 V rms
Squelch Detector, Emitter (Q346)	0.20 V rms
NOTES: 1. All voltages measured with Motorol referenced to chassis.	

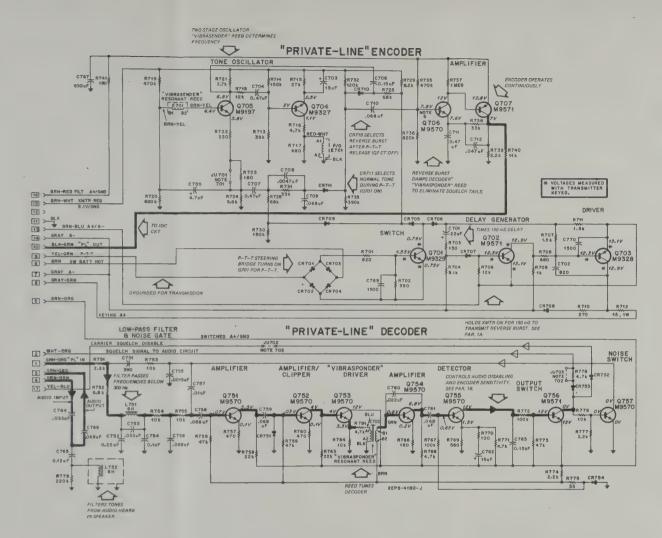
EPS-4799-0



microphone connector.

All voltages measured with respect to chassis ground.

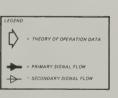
Supply voltage = 13.6 V dc.



"Private-Line" Decoder Schematic Diagram Motorola No. 63P81011E31-E (Sheet 1 of 3) 8/20/75-PO

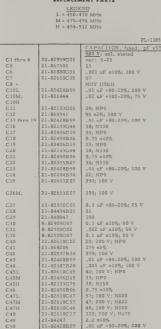
NOTES:
NOT SETEMBLES TONE OUTPUT LEVEL FACTORY DETERMINED.
NOT DETERMINES TONE OUTPUT LEVEL FACTORY DETERMINED. IN THIS MODE THE "PL".
NOTE RADIO IS SERVED WITH JUMPER JUNG OUT AND JUNG IN. IN THIS MODE THE "PL".
SOULE OF SERVITATY'S IS TO THE CARRIER SOULE OF SERVITATIVE THE THE PLAY SOULE OF SERVITATIVE SOURCE SERVITATIVE SOUPE SERVITATIVE SIN OPERADER OF A WINTED STATE "L" SOULCE SERVITATIVE SIN OPERADER OF A GRANER SOULE OF CONTROL. TO ACCOMPLISH THIS, INSERT JUMPER JUNG AND REMOVE JUMPER JUNG AND REMOVE

JUMPER JUPOZ
703. UNLESS OTHERWISE STATED, ALL CAPACITOR VALUES ARE IN PICOFARADS, RESISTOR
VALUES ARE IN OHMS, ALL RESISTORS ARE 1/4 WATT.
704. DC VOLTAGES TAKEN WITH 20K OHMS PER VOLT MULTIMETER WITH RESPECT TO



		REVISIONS		
CHASSIS AND SUFFIX NO.	REF.	CHANGE	LOCATION	REFER
712-4404 - 25- 124	.04	FR. M FOLLOWING		_
175 4888	. '5	BBS-TOBUSS TUNIN .		PEPS 4
		494 TACHLORK		
		0P8174G01 L X.KN 1		
		ATANIA JA I SEERE		
		CS 7 M. S ILNIN		
	,	A SEA LED WAY	-	
		21.00 (87H 4 070 p#		
	C335	ADDED 21K847087 220 pF ±10%: 300 V		
	. 6	220 pF ±10%; 300 V		
	1.4"	EMOVED (WAS		
	CR181	48C 32372E03) ADDED 48C 82256C 38 ADDED 24C 82835G13		
	1309	CHOKE; 0.82 uH		
	- EF		1	1
	7	- C. E		
		Fy. West.		
1 LN4448A-1	C751	FROM 21002102010		PEPS-48
	0.131	270 -F +5% 500 V, TO	1	PEPS-48
		FROM 6S129984, 680		
	- "6"	FROM 65129984, 680 #5%; 1/4 W; TO 69129779 560 #5%;		
		69129779 560 ±5%;		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1/4 W FROM 21S124554,	QI	PEPS-48
		; > = '0, 500 V; NP0		
	-	MOVED	L6	
		21D82610C03, 47 pF ±5%; 200 V; N220		
	75	#5%; 200 V; N220 ADDED 48C82392B03 FROM 6S129981. 3.3k ±5%; 1/4 W TO 6S129982. 5.6k ±5%;	Q116 RT670	}
		3.3k ±5%; 1/4 W TO 65129982, 5.6k ±5%;		
	R686	1/4 W FROM 65129681, 1.5k ±5%; 1/4 W TO 65129805, 1k ±5%; 1/4 W	0116	-
	1,000	1.5k ±5%; 1/4 W TO	COLL.	
		65129805, 1k ±5%; 1/4 W FROM 65129805.		
	R687	FROM 65129805, lk ±5%; 1/4 W TO 6S129708, 1.2k ±5%;		
		6S129708, 1.2k ±5%;		
	R688	1/4 W FROM 6S124A01, 10 ±5%; 1/4 W TO 6S124A19, 56 ±5%;	Q117 EMITTER	
		6S124A19, 56 ±5%;	23637721	
	R 182	bS144A19, 56 ±5%; 1/4 W FROM 6S129681. 1.5k ±5%; 1/4 W TO 4805, 1k ±5%; 11/4 W	Q101	
		11.5k ±5%; 1/4 W TO	BASE	
	R 190	1/4 W FROM 6S128686,	RT 180	
		8.2k ±10%; 1/4 W TO 6S129232, 3.9k ±10%;		
		in m nemerie		
		6.8k ±10%; 1/4 W		
TLE 1302A	C688	ADDED 21K847058.	CONNECTED	
(TLE6562A-1)		1/4 W FROM 6512868; 1/4 W FROM 6512868; 5.2k ±10%; 1/4 W ASSECTED 10%; 1/4 W ASSECTED 10%	IN PARALLEL WITH CR670 Q110	
	R 690	ADDED 65124D61. 4.7 ±10%; 1/4 W	COLL.	
TLN4448A-1	C701	4.7 ±10%; 1/4 W FROM 23-84762H03, 10 uF TO 23-84762H16, 22 uF	COLL. "PL' ENCODER (DELAY GEN-	PEPS-4849-
	R704		ERATOR)	
	1 104	FROM 6-124A80, 20k TO 6-124A72, 9.1k		
TLE6612A-1	RT100.	Deleted 6-82990E18.	Osc. Mod. Tripler	Trans-Rec
TLE6613A-1 TLE6614A-1	460, 461, 462	190 Ohms @25C.	Tripler	
TLE6592A-1 TLE6593A-1 TLE6594A-1	1	Circuit was as shown below:		
LE6594A-1		F 7101		
TLE8123A-1 TLE8123A-1		0-0-		
		1		
	1	RATE KXN4002A		
		1		
		PRT 100	1112	
	1			
.E6592A-2	C26L	From 21-865440, 180 ng	Parte List	None
.E6612A-2		From 21-865440, 180 pF To 21-82633E07, 390 pF		
		-		

SUFFIX NO	REF. SYMBOL	CHANGE	LOCATION	CIRC
A T.A Machicles' P. E. Aprila	E-5 .40	DELETED MOVED FROM MAIN CIRCUIT BOARD TO AUDIO PA ASSEMBLY	AUDIO & SQUELCH CIRCUITS	MA BC
		CHANGED FROM .008 uF, 8-82905G04, TO .1 uF, 8-82906J18	PARTS LIST	1
		FROM TYPE M4584 TO TYPE M9872		AU.
	115	FROM 22 OHM, 6-131641 TO 2.7 OHM ±5%, 6-124B55		MA BO
	CR1033	ADDED GERMANIUM, 48-82178A01		-
	1"	1/2 WATT, 6-125C19		AUI



C53M,

C54

C551. C55M

C56M.

C57 58

C56H

C60H

C62M

C64

C102

C103

C104. 1

E	MOTOROLA PART NO.	DESCRIPTION	REFERENCE SYMBOL	MOTOROLA PART NO.	DE: CRIPTION	REF
П	ST					
ч		RTANT	< 111	21-82877B36	250 ±10%, 75 V, N750	
ı h	NIV THE FOLL	OWING MOTOROLA	C112	21-867249	39	11 6
			C113	21-865941	90 ±2%; 300 V	3
P	ART NUMBERS	WHEN ORDERING	C114	21-859944	300	
	REPLACEM	IENT PARTS	C115 C116L	21~82428B59	.01 uF +80-20%; 200 V	0
	LEGE	ND	C116L	21-82133G39 21-83406D12	36; N150 33; N150	
	L = 450-4	70 MHz	C116H	21-82133G75	30; N150	
	M = 470-4		C117	21-82428B59	.01 uF +80-20%; 200 V	
	H = 494-5	12 MHz	C118	21-82450B29	0.51	0
			C119L	21-83406D18	47; N75	1 1 0
		PL-1185-E	G119M C119H	21-82204B29 21-82133G39	43 ±3%; 200 V; NP0	0
- 1		CAPACITOR, fixed: pF ±5%; 500 V; unl. stated	C120	21-82610C70	35; N150 150; 200 V; NP0	
- !	20-82959G01	var: 5~25	C121	21-82450B10	4.3	
	21-867302	13	C122	21-82187B20	.001 uF ±10%; 100 V	1 0
	21-82880G01	.001 uF ±10%; 100 V	C123, 124	21-82428B59	.01 uF +80-20%; 200 V	0
ı	21-82610C05	57	C125 C126L	23-83214C14 21-82610C29	47 uF ±20%; 15 V 51; 200 V; N150	0
- }	21-82428B59	NOT USED .01 uF +80-20%; 200 V	C126M	21-83406D44	47; N80	0
	21-861444	.02 uF +100-20%; 75 V	C126H	21-82204B29	43 ±3%; 200 V; NP0	
		100 00 1200-00 //, 13 7	C127L	21-82610C44	100	c
	ZI-8Z133G55	30; NP0	C127M	21-82610C44	100; 100 V	c
	21-865941 21-82428B59	90 ±2%; 300 V .01 uF +80-20%; 200 V	C127H C128, 129	21-82610C71 21-82428B59	90; 200 V .01 uF +80-20%; 200 V	C
15	21-82428B59 21-82133G44	.01 uF +80-20%; 200 V 18; N330	C130	21-840846	15; NP0	C
	21-82133G44 21-83406D19	33; NP0	C131	21-850118	100	3:
	21-82450B06	0.75 ±10%	C132	21-840847	5 ±0.5 pF; 1 0	C
	21-83406D19	33; NP0	C133L C133M	21-82989E26 21-8340cD1c	11.5 ±2.5%; NP0	
	21-82133G44	18; N330	C133H	21-83400D10 21-859176	11; N150	C
	21-82450B06 21-82355B07	0.75 ±10% 30; N330	C134	21-82537B16	9.5 ±0.25 pl; NP0 1000; 100 V	C
	21-82428B59	.01 uF +80-20%; 200 V	C135L	21-859642	9 ±0.5 pF; N'50	ì
. 1	21-82204B34	22; NP0	C135M	21-82133G79	8,2 ±0.5 pF; N150	C
	21-82633E07	390; 100 V	C135H C136	21-82133G76 21-82133G41	6.8 ±0.25 pF; N150 4.7 ±0.25 pF; NP0	0
	21-82633E07	390; 100 V	C137	21-82372C04	.05 uF +80-20%; 25 V	000
	21-82033EU?	390; 100 V	C138	21-82133G03	100: N750	C
	21-82372C01	0.1 uF +80-20%; 25 V	C139L,	21-82355B09	33; NP0	- 0
	21-84494B01	51	C139M C139H	21 040225	30: N150	C
	21-840047 8-82905G07	150	C140	21-849335 21-850510	470 ±10%; 300 V	0.00
	8-82905G07 8-82905G02	0.1 uF ±10%; 50 V ,022 uF ±10%; 50 V	C141L	21-867249	39	c
	8-82905G07	0.1 uF ±10%; 50 V	C141M	21-84494B24 21-84494B43	39	C
	21-82610C22	20; 200 V; NP0	C141H C142	21-84494B43 21-82450B18	36	C
	21-868205 21-82537B34	175 ±3%	C142 C143 thru	21-82133G03	100; N750	C
	21-82428B59	390; 100 V .01 uF +80-20%; 200 V	C146 .			C
	21-82187B20	.001 uF ±10%; 100 V	C148L C148M	21-82450B20	0.51	C
	21-82610C45	40; 100 V; NP0	C148M	21-82450B29	0.51; coded GRN-BRN-GRAY- GOLD	C
	21-83406D19 21-82133G75	33; NP0	C148H	21-82450B37	0.47; coded YEL-VIO-GRAY-	C4
	21-82133G75 21-82450B06	30; N150 0.75 ±10%			GOLD	C
	21-82610C47	57: 100 V: N220	C180	21-831125	100 ±10%; 3C0 V; N750	C4
	21-82610C57	47; 200 V; NZ20	C181	21-82133G03 8-83813HZ8	100; N750 .01 uF ±10%	C4
	21-82610C46 21-82610C27	40; 100 V; N220 120; 200 V; N470	C183	21-82133G03	100; N750	1 64
	21-84247	2.2 ±10%	C184	21-82428859	.01 uF +80-20%; 200 V	C-i
	21-82428B59	.01 uF +80-20%; 200 V	C185, 186	8-83293B18	.15 uF ±10%	C4
	Z1-82187B18	.0015 uF ±10%; 100 V	C187 C188	21-82133G03 8-83813H37	100; N750 .0068 uF; 100 V	C4
	21-82133G01	10; NP0	C189	21-831125	100 ±10%; 300 V; N750	C4
	21-82133G79	8.2 ±0.5 pF; N150	C190	23-82783B25	4.7 uF ±10%; 25 V	C4
	21-82450807	0.39	C191	21-82133G03	100 ±10%; N750	C4
	21-82133G02	12; NP0	C192	21-82133G03	100; N750 NOT USED	C4
	21-82133G01	10; NP0	C193 C194	8-83813H37	.0068 uF; 100 V	C4
	21-82989E20 21-82610C47	8.5 ±0.25 pF; NP0 57; 100 V; N220	C195	21-850118	100	49
	21-82610C47 21-82610C57	47; 200 V; N220	C196, 197,	21-82133G03	100 ±10%; N750	C4
			198 C301	23-83214C02	15 uF ±20%; 25 V	C6
59	21-82187B20	.001 uF ±10%; 100 V	C302 .	8-82905G07	0.1 uF ±10%; 50 V	C6
	21-124554 21-840849	22; NP0 20: NP0	C303	8-82905G07	0.1 uF ±10%	C6
	21-122235	18; NP0	C304	21-859939	110	C6
	21-82187B07	470 ±10%	C305 C306	8-82905G07 21-82428B59	0.1 uF ±10%; 50 V .01 uF +80-20%; 200 V	C6
	21-848525	16; NP0	C307	8-82905G07	0.1 uF ±10%; 50 V	C6
	21-82989E31 21-867302	14 ±2,5%; NP0 13; N220	C308	21-410089	27 ±10%	C6
	21-867302	16; NP0	C309	8-82905G07	0.1 uF ±10%; 50 V	C6
	21-82204B06	150 ±10%: N1500	C310	21-82428B59 8-82905G07	.01 uF +80-20%; 200 V 0.1 uF ±10%; 50 V	C6
	20-84579B03	var: 4-37.5 pF; 100 V coded	C311, 312 C313	8-82905G07 21-82187B21	820 ±10%; 200 V	C6
	20-84579B02	GRN var: 1.5-18.8; 100 V coded	C314	8-82905G07	0.1 uF ±10%; 50 V	C6
	20-8421AB02	BRN	C315	21-82428B59	.01 uF +80-20%; 200 V	C6
	20-84579B05	var: 4-37.5; 100 V; coded GRN	C316, 317 C318	8-82905G07 21-82187B21	0.1 uF ±10%; 50 V 820 ±10%; 200 V	C61
5	3-83706G15 21-861438	(tuning screw) 220; ±10%; 75 V; N1400	C319	8-82905G07	0.1 uF ±10%; 50 V	1

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION	REFERENCE	PART NO.
			C609L, C609M	21-84494B48
C320	21-82428B59	.01 uF +80-20%; 200 V	C609M	21-84494847
C321, 322 323	8-82905G07	0.1 uF ±10%; 50 V	2610	21-82372C04
C324	21-82537B36		C6111	21-84494B02
C325, 326		1150; 100 V	C611M	22-011/12/02
C325, 326	21-863291	1500 ±2%	C611H	21-82537B08
C328	21-83761D36 21-82428B59	100; 100 V; N220	C612	8-82905G30
C329	21-837746	.01 uF ±80-20%; 200 V	C613	21-84494B18
C330	21-859942	2000 ±10% 220	C614L,	21-84494B45
C331	8-82905G07	0.1 uF ±10%; 50 V	C614M	
C332	21-82428B59	.01 uF +80-20%; 200 V	C614H	21-84494B01
C333	23-83214002	15 uF ±20%; 25 V	C615	8-82905G30
C334	8-83293B02	0,22 uF ±10%; 50 V	C616	21-847088
C335	21-847087	220 ±10%: 300 V	C617L,	21-84494B46
C340, 341	8-83293B18	0.15 uF ±10%; 50 V	C617M	
C342	23-83214C15	4.7 uF ±20%; 25 V	C617H	21-84494B26
C343	23-83214C02	15 uF ±20%; 25 V	C618L,	21-84494B02
C344	8-82905G23	.02 uF ±10%; 100 V	C618M C618H	21-84494B01
C345	8-83293B02	0.22 uF ±10%; 50 V	C620	8-82905G30
C346	8-82905G01	.01 uF ±10%; 50 V	C621	21-84494B40
C347, 348 C349	8-82096J18	0.1 uF ±10%; 250 V	C622L,	21-859938
C350	8-82905G16 8-82905G03	.056 uF; 200 V .047 uF ±10%; 50 V	C622M	
C352	21-82537B16	1000	C622H	21-852322
C354	23-83214C15	4.7 uF ±20%; 25 V	C623	23-83214C02
C355, 356,	23-83214C02	15 uF ±20%; 25 V	C624L,	21-859937
357			C624M	
C358	21-82428B59	.01 uF +80-20%; 200 V 500 uF +100-10%; 20 V .01 uF +80-20%; 200 V	C624H	21-859940
C359	23-83210A19	500 uF +100-10%; 20 V	C625	21-82537B16
C360	21-82428B59	.01 uF +80-20%: 200 V	C626L	21-84494B45
C430	21-82610C22	20; 200 V; NP0	C626M C626H	21-84494B44
C431	21-868205	175	C626H C627	21-84494B25 21-82372C04
C432	21-82537B34	390; 100 V	C628	21-82372C04 21-83191A01
C433 C434	21-82428B59	.01 uF ±80-20%; 200 V	C629L	21-84494B39
C434 C435	21-82610C22 21-868205	20; 200 V; NP0	C629M	21-84494B38
C435	21-868205 21-82537B34	175	C629H	21-84494B39
C437	21-82428B59	390; 100 V .01 uF +80-20%; 200 V	C630L,	9-82905G02
· C438	21-82610C22	20; 200 V; NP0	C630M	
C439	21-868205	175	C630H	1
C440	21-82537B34	390; 100 V	C631L,	21-82187B26
C441	21-82428B59	.01 uF +80-20%: 200 V	C631M	
C460 .	23-82783B25	4.7 nF ±10% · 25 V	C631H	21-82372C04
C461	21-861438	220 ±10%; 75 V; N1400 250 ±10%; 75 V; N750	C640L, C640M	21-82785H47
C462	21-82877B36	250 ±10%; 75 V; N750	C640H	21-82785H52
C463	21-867249	39	C641	21-859963
C464 C465	21-865941	90 ±2%; 300 V	C642L	21-835358
C466	21-859944	300 .01 uF +80-20%; 200 V	C642M	21-82880E32
C467	23-82783B25	4.7 uF ±10%; 25 V	C642H	21-82785H51
G468	21-861438	220 ±10%; 75 V; N1400	C650	21-84494B41
C469	21-82877B36	250 ±10%; 75 V; N750	C651L,	21-84494B38
C470	21-867249	39	C651M	
C471	21-865941	90 ±2%; 300 V	C651H	21-84494BZ9
C472	21-859944	300	C652L	21-847772
C473	21-82428B59	.01 uF +80-20%; 200 V	C652M C652H	21-847771
C474	23-82783B25	4.7 uF ±10%; 25 V	C652H C653L	21-848156
C475	21-801438	220 ±10%; 75 V, N1400	C653M	21-847771
C476	21-82877B36	250 ±10%; 75 V; N750	C653H	21-848156
C477 C478	21-867249 21-865941	39	C654	21-83191A01
C478 C479	21-865941	90 ±2%; 300 V 300	C655L,	21-84494B01
C480	21-854744 21-82428B59	.01 uF +80-20%; 200 V	C655M	
C490	21-82133G03	100; N750	C655H	21-84494B44
C491, 492	21-861219	1000 +100-0%; coded RED	C656L,	21-84494B01
C493	23-83214C02	15 uF ±20%; 25 V	C656M	
C494, 495,	21-861219	1000 +100-0%; coded RED	C656H	21-84494B44
496, 497		The same same	C657	21-83191A01
C498, 499	21-82355B07	30; N330	C658L,	Z1-84494B45
C600L,	21-84484B44	47 .	C658M C658H	21 04/0/07
C600M			C659L,	21-84494B25 21-84494B45
C600H	21-84494B28	43	C659L, C659M	61=84494545
C601L,	21-84494B91	51	C659M	21-84494B25
C601M			C660	23-83214D02
C601H	21-84494B28 21-84494B18	43	C661L,	21-84395B04
C602		390	C661M	010,5204
C603	8-82905G30	0.1 uF ±10%; 50 V	C661H	21-84395B02
C604 C605	23-83214C02 21-84494B18	15 uF ±20%; 25 V 390	C662L,	21-84494B43
C606	21-84494B08	170	C662M	
C607L,	21-84494B08	170 27	C662H	21-84494B33
C607L,	21-04474542	2	C663L,	21-84494B41
C607M	21-84494B43	21	C663M	
C608L.	21-84494B38	15	C663H	
C608M			C664L,	21-84395B04
	21-84494B37	11	C664M	

21-84494B48 180 C665 C668 1-84494B47 140 21-82372C04 .05 uF +80-20%; 25 V 1-84494B02 62 C672M 1-82537B08 49 ±3%; 300 V C672H 8-82905G30 0.1 uF ±10%; 50 V C673 C674, 675 C676 C677 1-84494B18 390 21-84494B45 56 1-84494B01 51 685 8-82905G30 0, 1 uF ±10%; 50 V C686 21-847088 10 ±5%; 500 V 21-84494B46 180 21-84494B26 | 130 21-84494B02 62 1-84494B01 51 C693M 8-82905G30 | 0.1 uF ±10%: 50 V C693H 21-84494B40 | 390 ±10%; 300 V C694L 21-859938 C694M C694H 21-852322 23-83214C02 | 15 uF ±20%: 25 V C695M 21-859937 | 24 C695H 1-859940 C696M, 21-82537B16 | 1000; 100 V C696H 21-84494B45 | 56 C701 21-84494B44 47 C702 21-84494B25 49 21-82372C04 ,05 uF +80-20%; 25 V C704 21-83191A01 1000 +100-0% C705 21-84494B39 | 19 ±0.5 pF; 300 V C706 21-84494B38 15 C707 21-84494B39 19 ±0.5 pF; 300 V C708 9-82905G02 .022 uF ±10%; 25 V NOT USED C712 21-82187B26 ,003 uF ±10%; 100 V 21-82372C04 .05 uF +80-20%; 25 V 21-82785H47 36; 850 V C754 C755 21-82785H52 | 30 ±1 pF; 850 V C756 21-859963 15 21-835358 15 ±10% 21-82880E32 | 13; 850 V C760 1-82785H51 | 10 ±0.5 pF; 850 V 21-84494B41 24 C762 21-84494B38 | 15 C764 1-84494B29 10 C765 21-847772 34 ±5%: 500 V C766 21-847771 27 21-848156 30 21-847771 | 27 21-848156 30 CR40 21-83191A01 1000 +100-0% 21-84494B01 51 1-84494B44 47 21-84494B01 51 1_84494B44 47 21-83191A01 | 1000 +100-0% CR301 21-84494B45 56 342 1-84494BZ5 49 21-84494B45 | 56 1-84494B25 49 23-83214D02 | 15 uF ±20%; 25 V 21-84395B04 120 21-84395B02 100 21-84494B43 | 36 CR462 1-84494B33 30 21-84494B41 24 CR640 1-84395B04 120 21-84395B02 100

DESCRIPTION

REFERENCE MOTOROLA SYMBOL PART NO.

DESCRIPTION

21-82372C04 .05 uF +80-20%: 25 V 21-84494B18 390 100 ±10%; 75 V; N220 21-82187B10 270 21-121462 12 ±10% 21-82133G71 10 ±0.5 pF; N150 21-82785H48 150 ±10%: 850 V C679 thru 21-82133G03 100; N750 23-82783B07 33 uF ±20%; 25 V C687 21-82133G03 100, N750 C6881,688M 21-82133G71 10 ±0.5 pF; N150 C689 NOT USED C690, 691 8-82905G01 .01 uF ±10%; 50 V NOT USED 21-82187B16 .003 uF ±10%; 100 V NOT USED NOT USED 8-82905G25 .0033 uF ±10%: 100 V NOT USED NOT USED 21-859940 20 NOT USED NOT USED 21-867845 3 ±0.5 pF 23-84762H16 22 uF ±10%; 20 V 21-82187B21 820: 200 V 23-83214C02 15 ±20%: 25 V 8-82905G06 0.47 uF ±10%; 50 V 23-83214C15 4.7 uF ±20%; 25 V 8-82905G06 0.47 uF ±10%; 50 V 8-82905G26 .0047 uF; 100 V C709, 710 8-82905G04 .068 uF ±10%; 50 V 8-82905G06 0.47 uF ±10%; 50 V 8-82905G03 .047 uF ±10%; 50 V 21-865922 390 ±10% 8-82905G11 0.22 uF ±10%; 50 V 8-82905G08 ,033 uF ±10%; 50 V 8-82905G07 0,1 uF ±10%; 50 V 21-82187B18 .0015 uF; 100 V 8-82905G04 .068 uF ±10%; 50 V 8-82905G01 -01 uF ±10%: 50 V C758, 759 8-82905G04 .068 uF ±10%; 50 V 8-82905G02 ,022 uF ±10%; 50 V 8-82905G04 .068 uF ±10%; 50 V 23-83214C02 15 uF ±20%; 25 V 8-82905G05 0.15 uF ±10%; 50 V 8-82905G08 .033 uF ±10%; 50 V 8-82905G09 0.12 uF ±10%; 50 V 8-82905G04 .068 uF ±10%; 50 V 23-82601A25 100 uF +150-10%; 20 V C769, 770 | 21-844163 | 1500 ±10%; 250 V SEMICONDUCTOR DEVICE,
diode: (SEE NOTE I)
silicon CR41 48-82139G01 germanium CR100 48-82190H13 silicon; varactor type CR101 48-82392B03 silicon CR102, 103 48-82139G01 germanium CR10c, 103 48-8219y001 germanum CR104, 105 48-82392B03 silicon CR180 NOT USED CR181 48-82256C38 silicon; Zener type; 9.1 V 48-82139G01 germanium CR340, 341, 48-82392B03 silicon CR343 48-82256C43 silicon; Zener type; 9.1 V CR344, 345 48-82392B03 silicon CR346 48-82525G01 silicon CR401 48-82525G07 silicon CR430, 431, 48-82392B03 silicon 48-82190H13 silicon; varactor type 48-82392B03 silicon 48-82190H13 silicon; varactor type CR463 48-82392B03 silicon CR464 48-82190H13 silicon; varactor type CR465 48-82392B03 silicon 1-80732B66 assy., varactor type incl.
43-84310C01 BUSHING, mounting CR670,671 48-82139G01 germanium CR672 48-82256C38 silicon; Zener type; 9.1 V CR673,674 48-82392B03 silicon

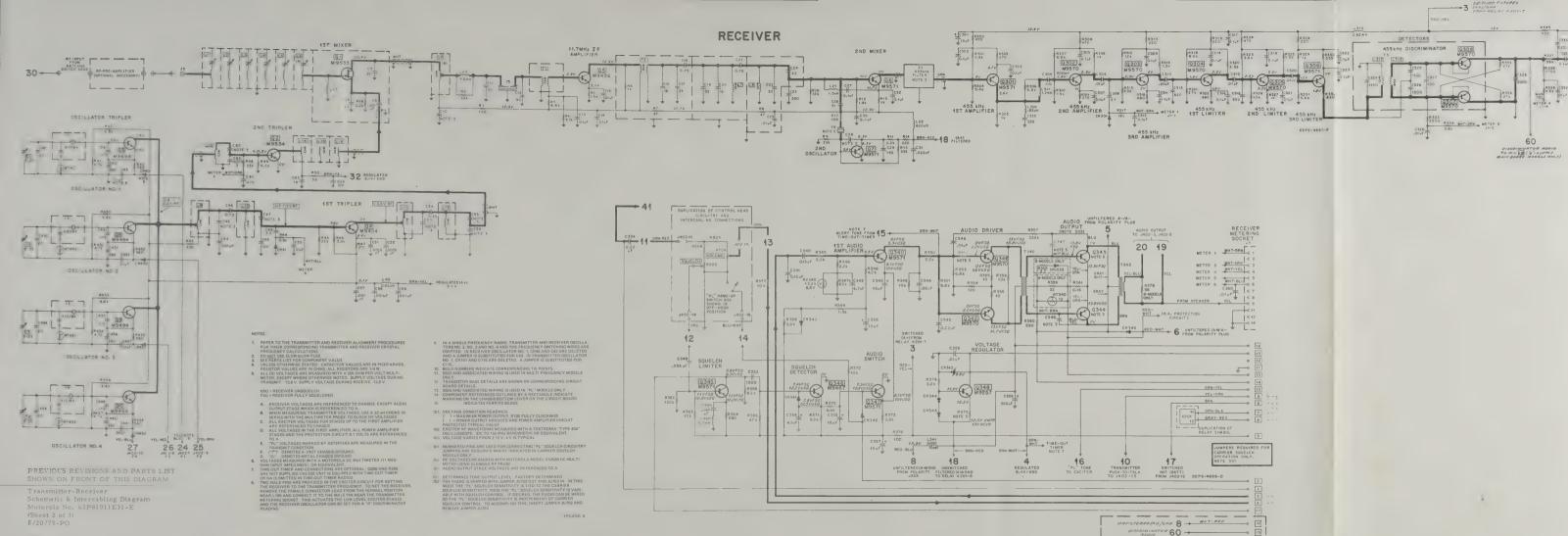
REFERENCE | MOTOROLA

SYMBOL PART NO

## ## ## ## ## ## ## ## ## ## ## ## ##				l.		
## ## ## ## ## ## ## ## ## ## ## ## ##	704	16 87 164 101	rilson			
CR 705 have 46-82378803 silicon		10-0-10-101	ville on	Liel	1-80780A83	15-7/8 turns, tapped at 5-1
CRITOSTAN 48-E379.200 silicos criticos critic		1				turne, does not include
1.164		48-82392B03	silicon			76-83419C02 CORE tuning
### ### ### ### ### ### ### ### ### ##	711 751					10-63417GOZ CORE, tuling
### 1.10	144, 154			L16M	1-80727B54	12-3/4 turns; tapped at 3-1
CALLOSS CALL	thru 754				1	turns
T_NAS24A T_NAS24A T_NAS25A	CR1033	48-82178A01	germanium	1 1/11	1 003337066	
### TIN6826A TIN6826A TIN682			"UTDDACENDED" DECONANT	TIOH	1-80/2/200	
T.N824A	1	3 1	"VIDRASENDER RESONANT			
T.N. Ping 10" In In In In In In In I			REED	7 177	24 02004/201	2 1/2 turner coded PED
### TINSSBIA PIECE	12701	T 1 316 924 A	Halma in Hamit	2112,	54-03004001	J-1/L turns, could KED
T_N8181A	20102	2421000021	brag-m ours		1	
T_N8181A				1.1734	24_83884G07	2-1/2 turns: coded GRN
T.N. SEED 121 24-8285004 24-825006 24-8285007		1 1	"VIBRASPONDER" RESONANT			-b-b 6 6 U
TANSBERGE Types-in-wait Types-in			D FOR D			choke; 5.5 mm
1		1	REED	L21	24-82835G04	choke: 1.5 uH
1	E702	TLN8381A	"plug-in"unit			-h-h 420 H
10 9-82/48C		- 1				enoke; ozo un
10 9-82/48C		1			24-82835013	cnoke, V. 62 uh
10 9-82/48C			CONNECTOR, receptacle:	1 1011	24_83810009	11-1/2 turns; coded B111:
101 9-8274801 101 101 101 102 102 101 101 102	J1 1	9-82748G01	female: 12-contact	210121	24-03010007	1 7/ 0315/1101 CODE
Pate RF deck Female; 2-contact facil. 14-8338A2 BODY,		, , , , , , , , , , , , , , , , , , , ,	4	FIGUR		MCI 70-83150HUI COKE,
June	JZ		(not replaceable; order com-	1		tuning: coded GRN
			plete RF deck)	7 10157	24 02010020	10 1/2 turner pedad VIOs
Incl. 14-82338A02 BODY, 1102 24-84972A08 24-84982A08 24-84982A	T101	0 82749003	female: 12-contact	LIOIN	24-03010010	10-172 tutns, coded vio,
1402 1402 28-802820 1402 28-802820 1403 28-802820 1403 1402 28-8072A08 1403 1402 1403		3405140001	temate, in-contact			incl. 76-83156H01 CORE,
15-contact type 29-0233A0.1 TackMINAL, contact: female placemater: female placemater: female placemater: female placemater place	J401		incl. 14-82338A02 BODY,			tuning: coded GRN
TERMINAL contact: female make; 19-contact female;			15-contact tyme 29-82336A01			0.1/2.
March Marc		5	municipal control of the control of	L102	24-84972AU6	8-1/2 turns; tapped at 3-5/
March Marc			TERMINAL, contact: temale		1	turns: coded ORG
	.1402	28-802820	male: 19-contact	1.100	1 24 040723041	0.1/2
RELAY, armsturg: 1056 does not incl. 1106 24-84972A02 24-84972A03 107m "C"; coll res 100 ohms 1056 does not incl. 1106 24-84972A01 24-84972A01 3-1/2 turns; no tap; coded £D. 24-84972A01 3-1/2 turns; coded £D. 1107M 24-83810G0 110			6 1 1 1 1 1 1 1 1 1	L103	24-84415404	0-1/2 turns; no tap; coded
RELAY armsture: LIOS 24-8872A05 EVII; conded £LD EVII; conde	3403		remare; coaxiar; uni type;		1	WHT
RELAY, armature: 100 ohms 10%, does not incl. 14-8459301 COVER, relay 1105 24-8472A02 24-72411 1107 24-831000 111/2 turns; coded \$ED 1107 1			(p/o K402)	7.104	24-840724.00	
RELLY, armsture: 1056 does not incl. 1106				Tion	-4-04712AU3	o-1,5 turns, tapped at 4-5/
RELAY, armsture: 105, does not incl. 1105 24-8972A02 24-8972A02 24-8972A03 24-8972A03 24-8972A03 24-8972A03 24-8972A03 24-8972A04 24-89816009 24		1				turns; coded RED
10			KELAY, armature:	1.105	24-84972AD2	2-1/2 turns: no tap: coded
10% does not inch 14-8595801 COVER, relay 1.106	K201	80-84569A01	3 form 'C': coil res 100 ohme	2,000		n nat
14-84593B01 COVER, relay	4002	01307201	TIOTHE O , COM TOO TOO DIMING			
14.84591801 COVER, relay LIOTH L			±10%; does not incl.	1.106	24-84972A11	3-1/2 turns; no tap; coded
NOTE Fled -servicing of this Lin9H, Lin9H Li		2	14-84593B01 COVER, relay	2,00		
TLN4476A REED SWITCH: "antenna relay" L107H L107H L24-83810G10 L10-1/2 turns; coded GRN L108H		1		1		
TLN4476A REED SWITCH:		1	His watering	L107L.	24-85810G091	11-1/2 turns; coded BLU:
NOTE Field -servicing of this						
NOTE NOTE Fieldservicing of this litem is not recommended. Linem L			Prop current	LIOVM		Inci, 10-03130MULCORE,
NOTE Field *Fervicting of this laten is post accommended. Replace entire unit. L108H L						tuning; coded GRN
NOTE Field-servicing of this laten a soot accommended.	K202	TIN4476A	"antenna relay"	7.1071	24 93810010	10-1/2 turner coded MIO.
NOTE Field - Servicing of this liem is not recommended. LIOSM				Livin	-4-03010010	.u-1/2 turns; coded VIO;
NOTE Field - Servicing of this liem is not recommended. LIOSM					1 1	incl. 76-83156H01 CORE,
Field-servicing of this litem is not recommended. Replace entire unit. LiOBM Lio			NOTE			tuning: coded GRN
			Dield annulaine of this			tuning, could only
Replace entire unit.				L108L,	24-83810G091	11-1/2 turns; coded BLU;
Replace entire unit.			item is not recommended.	T 10834	1 1	incl 76-83156WA / L-
Lil	1	1	Danlage entire unit	Troom		
COLL, RF:			repace entere mitt		1	tuning; coded GRN
COLL, RF:		1		1.108H	24_83810G10	10-1/2 turns: coded VIO:
11		3	COU BE-	Livois	24-03010010	10-1/2 (4112), 00000 710)
1.1						
1.1			4 turns; tapped			tuning; coded GRN
LIH	LIM	1-80727B50	3-7/8 turns: tapped	1 1007	24 92910500	11 1/2 turner coded Dt II.
121		1 B07777067	2 13/16 ************************************		F4=0301000A	11-1/2 turns; coded BLU;
121A				L109M		incl, 76-83156H01 CORE.
12	LZL	24-83853G03				tuning: coded CDM
12H						Lainig, coded ORIV
12H 24-8355033 3-17 18 turns 1.12 12 24-835618 16c., 76-83156081 6-8 16c., 7			3-1/0 turns	L109H	24-83810G10	10-1/2 turns; coded VIO:
131M	L2H	24-83853G35	3-11/16 turns		1	inel 76-831561001 E-000
1.3M						Mari 10-07:301 1 1 1 2
1.10						tuning; coded
13H				L120, 121	24-82835G13	choke: 0.82 .
LIAL	1311	24183853035				
All		e-41-03033033	J-11/10 turns			powdered at A roomt
1.12	LAL	24-83853G03	4 turns	L123, 124	24-800484	choke: 0.20 U.
1.24	1434	24183853032	3_7/8 turns	1.135	24 03547511	1 1 /2
1.5						
15M		24-83853G35		L126	24-800484	choke; 0.32 uH
24-8855012 3-7/8 turns 1-10 24-8285013 24-82850	1.51.	24-83853G03	4 turns			
1.5		24,02053000				choke; I fi
1.54		Z4183853G32	3-7/8 turns	L309	24-82835G13	choke; 0.82 uH; coded GRA
1.6(A)M 1-80780.72		24:83853G35	3-11/16 turns			DED CHIVED
LogApM 1-8 "Te4" turns (from straight end Logard						
Local Loca	Lo(A)L	1-80780A72	4-1/4 turns; tapped at 1-5/8	L310	24-82135G01	choke: 0,62 mH
Link		2	turns from straight and	7.311		
1.60727951 turns from straight end straight end from straight			TOTAL STREET STREET		44-84835018	unuke, t.J m.
List Learn List List Learn List Learn List Learn L	LO(A)M	1-9 54.	1-1 % tions, tipper it 1-5, 5	13.2		121 V 431
L6[A]			turns from straight end	1 2 1 2		1-1- T21
1.40			and troub estaight and			
1.40	Lb(A)H	1=80727B51	4 turns; tapped at 1-5/8 turns	L314	24-82135G07	choke; 2 mH
Life 24-83879001			from straight end			ababa, 5 7 13
1.7 24-8357004 coded YEL; incl. tuning core 1.600 24-83977891 coded YEL; incl. 76-83156108 1.601 24-849772.07 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 1.602 24-84614.0			ar our ovi argin our			enoke; 5.7 mH
1.7 24-8357004 coded YEL; incl. tuning core 1.600 24-83977891 coded YEL; incl. 76-83156108 1.601 24-849772.07 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 24-84972.07 1.601 1.602 24-84614.0	Lb(B)	∠4-83879G01	coded BRN; incl. tuning core	L341	25-82878A03	AF choke: 70 mH
1-1/2 turns; tapped; coded BILU; incl. 76-81356408 L601 24-84614A03 24-84972A04 B-1/2 turns; coded GNR L602 24-84614A03 24-84972A04 B-1/2 turns; coded GNR L603 24-84614A02 24	1.7. 8	24-83879004	coded YEL: incl. tuning come			abalan a /a famila b
L10	1.0		6 1/2	1000	64-034111941	
BLU; incl. 76-83156H08 L601 24-84614A03 2-6ke; c; of ferrite body and l-1/2 turns; coded GRN L602 24-88972A04 B-1/2 turns; coded WHT; incl. 76-83156H08 CORE, tuning; coded GRN L603 24-84614A03 24-84614A03 24-1/2 turns of wire 24-84972A12 L112 L12 L12 L12 L12 L13 L14 L14 L15	Ly	44-8497ZA07	o-1/2 turns; tapped; coded			1-1/2 turns of wire
CORE, tuning; coded GRN			BLU: incl. 76-83156H08	1.601	24-84614402	2-1/2 turns
L10						e-t/c turns
1-1/2 turns of wire			CORE, tuning; coded GRN	L602	24-83977B01	choke; c/o ferrite body and
Incl. 76.83156008 CORE, tuning: coded GRN L603 24.84614A02 24.72 turns L603 L603 24.84614A02 24.72 turns L603	L10	24+84972AD4	8-1/2 turns: coded WHT-			1-1/2 turns of wire
LI1 24-8497ZAIZ tuning; coded GRN 24-8461840 24-1/2 turns; proded GRN 24-8497ZAIZ turns; coded GRN 24-849ZAIZ turns; tapped; coded GRC, incl. 76-81560R5 CORE, tuning; coded GRC, incl. 76-81560R5 CORE, turns; tapped; tapped; co		1	11 26 0335(1100 CODE			*-*/* furns of wire
L11 24-8497ZA12 tuning; coded GRN 24-8491A03 2-1/2 turns; apped; coded YEL; incl. 76-83156108 COCR, tuning; coded GRN 1.606, 607 76-83960B01 24-84961A02 4-1/2 turns (coded GRN 1.606, 607 76-83960B01 24-8497ZA11 3-1/2 turns; coded GRN 1.606, 607 76-83960B01 24-8497ZA11 3-1/2 turns; coded GRN 1.606, 607 76-83960B01 24-84961B02 24-84961B02 24-8497ZA13 76-1/2 turns; tapped; coded GRN 1.609 24-84861B02 1-1/2 turns is tapped; coded GRN 1.609 24-849861B02 1-1/2 turns is tapped; coded GRN 1.609 24-849861B02 1-1/2 turns is pecial type 24-84985802 13-7/8 turns; tapped at 3-1/4 turns; does not include 76-8419C02 CORE, tuning 1.509 24-84385602 13-5/8 turns; does not include 76-8419C02 CORE, tuning 1.509 24-84385602 11-5/8 turns; does not include 1.509 24-843856017 12-1/2 turns; apecial type 2-1/2 turns; apecial type 1.509 24-843856017 12-5/8 turns 1.509 26-849600 200 200 200 200 200 200 200 200 200			mci. 16-83156HU8 CORE,	L603	Z4-84614A02	4-1/Z turns
L11 24-8497ZA12 3-1/2 turns; tapped; coded YEL; incl. 76-813156408 CORE, tuning; coded GNN 3-1/2 turns; tapped; coded CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded to CNR tuning; coded GNR 3-1/2 turns; tapped; coded tuning; c			tuning: coded GRN		24-84614402	
VEL; incl. 76-83156008 L606, 607 76-83960301 CCORE, tuning; coded GRN L609 L609 24-88960301 CCORE, tuning; coded GRN L609	111	24 04072442	2 1/2 manner termed, and			
VEL; incl. 76-83156108 L606, 607 76-83960B01 CoRE, tuning; coded GRN L608 24-80900A65 choke; 1,02 were cc. L609 L609 24-80900A65 choke; 1,02 were cc. L609 L60	PII	21 V 21 659 459	3-1/2 turns; tapped; coded			4-1/2 turns
CORE, tuning; coded GRN 31/2 turns; coded GBLN; incl. 76-83156008 CORE, tuning; coded GRN 31/2 turns; coded GRN 31/2 turns; coded GRN 44-84972A13 31-1/2 turns; tapped; coded ORE, tuning; coded GRN 24-84972A13 31-1/2 turns; tapped; coded ORE, tuning; coded GRN 24-83856007 24-83156008 CORE, tuning 24-83156008 CORE, tuning 24-83156002 21-84972A13 24-83156007 24-83156000 CORE, tuning 24-83156004 24-83156007 24-83156004 24-83156004 24-83156007 24-83156007 24-83156007 24-83156007 24-83156007 24-83156007 24-83156008 24-80900A66 24-80900A66 24-80900A66 24-80950A66 24-8095		1	YEL; incl. 76-83156H08			ferrite head
L12 24-8497ZAl1 3-1/2 turns; coded BLK; incl. 76-8315608 CORE, tuning; coded GRN L640 L640 L640 L640 L640 L640 L640 L640				2,000,007	24 0000001	
L12 24-8497ZAl1 3-1/2 turns; coded BLK; incl. 76-8151608 CORE, tuning; coded GRM, 2-1/2 turns; special type Coded GRM, 2-1			CORE, tuning; coded GKN			choke; 1.02 . 1. see ec
incl. 7-8-8156008 CORE, tuning: coded GRN 24-84972A13 3-1/2 turns; tapped; coded CORE, tuning: coded GRN L14 24-83858003 13-7/8 turns; tapped at 3-1/4 turns; todes not include turns; coded GRN L15L 24-83858002 13-5/8 turns; tapped at 3-1/4 turns; does not include turns;	L12	24-84972A11	3-1/2 turns; coded BLK:	L609	24-84861R02	2-1/2 turns
LIS 24-83585014 12 turns; coded GRN 24-83858014 12 turns; code GRN 24-84888014 12 turns;			incl 76_83156M08 CORE		1000	
L13			MICEL TO-03130HU0 CORE,	T940		consists of 10-129396 WIRE
L13			tuning; coded GRN			electrical: No. 18 solid con
L14 24,83856073 tuning: coded GRN 24,83856073 1-7/8 turns; tapped at 3-1/4 turns; does not include turns; special type consists of No. 8 wire used a straightful deal turns; does not include 3-3860 SCREW, machine: 4-40 x 1/8" "Male	13	24 84972412	3-1/2 turner tanned: cod-1	1		1 /211 1
L14 24-83858003 tuning: coded GRN 24-83858007 27-78 turns; tapped at 3-1/4 turns; does not include turns; special type curns; special type turns; special type		m2001712/613	J-1/2 turns; tapped, coded			1/c length required
L14 24-83858003 tuning: coded GRN L542L, L642L, L642M L542H L55L 24-83858042 13-5/8 turns; taped at 3-1/4 turns; does not include 3-3860 SCREW, machine: 4-40 x/18" "Male			ORG; incl. 76-83156H08 CORE	L641	7-84311C01	special "feed-thru bracket"
L14			tunings coded CPN			industrial and the contraction of the contraction o
turns; does not include turns; does not include to 6.8419COZ CORE, tuning L15L 24_83858COZ 13-578 turns; does not unclude tl5M 24_83858COZ 14 12 turns; does not unclude tl5M 24_83858COZ 15-83419COZ CORE, tuning L15M 24_83858COZ 17 12-578 turns; does not unclude tl5M 24_83858COZ 17 11-578 turns turns tl5M 24_83858COZ 17 11-578 turns turns tl5M 24_83858COZ 17 11-578 turns turns tl6M 24_80Z 18_80Z 18_			turing, coded Ords	1		
turns; does not include L642M L642H 1-80729B89 2-1/2 turns; special type L642H 1-80729B89 2-1/2 turns; special type L643 47-8430SC01 13-5/8 turns; does not include L643 47-8430SC01 a straight root; length does a straight root; length does include 3-3860 SCREW, machine: 4-40 x 1/8" "Mal.		Z4+83858G03	13-7/8 turns; tapped at 3-1/4		1-80717B19	Z-1/2 turns; special type
76-83419C02 CORE, tuning	L14		turns; does not include			
LISL 24-8385802 13-5/8 turns; does not nclude to the state of the stat	L14					
L151. 24-8355802 13-5/8 turns; does not include to the total turns; does not include to the total turns; does not include to the turns tur	L14		76-83419G02 CORE, tuning	L642H	1-80729B89	Z-1/2 turns: special type
76-83419G02 CORE, tuning a straight red; length does include 3-3860 SCREW. LISM 24-83858G14 12 turns include 3-3860 SCREW. LISH 24-83856G17 11-5/8 turns	L14		12 5 /0 200000 3000 0000			- 1,5 curio, special type
76-83419002 CORE, tuning a straight rod; length does include 3-3860 SCREW, include 3-3860 SCREW, include 3-386317 11-5/8 turns inachine: 4-40 x 1/8" Alle			13-3/0 turns; does not include	T043	47-84308C01	consists of No. 8 wire used
L15M 24-83858G14 12 turns include 3-3860 SCREW, L15H 24-83858G17 11-5/8 turns machine: 4-40 x 1/8" "Alle		24-83858G02		1		a straight rod: length door
L15H 24-83858C17 11-5/8 turns machine: 4-40 × 1/8" "Alle		24 ₇ 83858G02	76-83419G02 CORE, tuning			a see arking rou, rengen does
L15H 24-83858G17 11-5/8 turns machine: 4-40 x 1/8" "Alle	L15L		76-83419G02 CORE, tuning			
	L15L L15M	24-83858G14	12 turns			include 3-3860 SCREW,
hex socket head	L15L L15M L15H	24-83858G14	12 turns			include 3-3860 SCREW,
	L15L L15M	24-83858G14	12 turns			include 3-3860 SCREW, machine: 4-40 x 1/8" "Alle
	L15L L15M	24-83858G14	12 turns			include 3-3860 SCREW, machine: 4-40 x 1/8" "Alle

REFERENCE MOTOROLA

SYMBOL PART NO

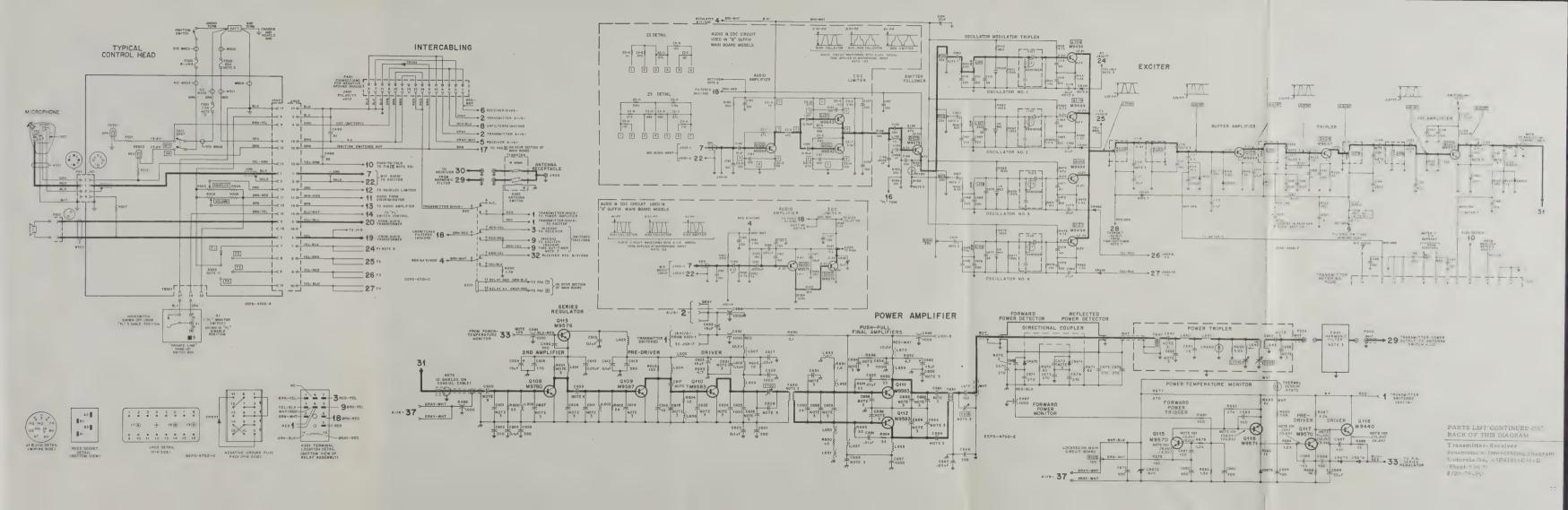


"B" SUFFIX MAIN BOARD MODELS ONLY

EMITTER

FOLLOWER

44----



REFERENCE	MOTOROLA PART NO	DESCRIPTION	REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
			R4	6-129231	3.3k
L650 thru	76-83960B01	ferrite bead	R5	6-127803	1.5k
653			Ro	6-127802	1k
L654, 655 '	24-84861B01	1-1/2 turns	R7. 8	6-129233	47
L657	76-83960B01	ferrite bead	R9 R10	6-127807	33k
L670 thru 672		NOT USED	RII	6-129230	12k
L673	76-839b0B01	ferrite bead	RIZ	6-129804 6-129269	2.2k
L674	70-839001501	NOT USED	R13	6-127807	1.8k
1.751	24-84003A01	AF choke; 6 H	R14	6-127800	220
1752	24-84004A01	AF choke; 6 H; shielded	R15	6-129805	1k
LIJL	24-04004701	Ar choke, or, shielded	R16	6-185B83	2.2k: 1/8 W
		CONNECTOR when	R17	6-131524	100
P201, 202	28-82331G01	CONNECTOR, plug: male; coaxial; miniature type	R40	6-128687	6.8k ±5%
P401		incl. 14-82337A05 BODY:	R41	6-129669	4.7k ±5%
		15 cont type 29-82335A01	R42	6-129779	560 ±5%
		TERMINAL, contact: male	R43	6-129775	330
		15-83622E02 SHELL	R44	6-129232	3.9k
			R45	6-128685	22k
		TRANSISTOR: (SEE NOTE I)	R46	6-129232	3. 1k
N	48-869533	TRANSISTOR: (SEE NOTE I) field-effect; N-channel; type	R47	6-129752	270
		M9533	R48	6-127807	33k
4.	48-869534	N-F-N; type M9534	R49	6-129669	4.7k ±5%
10	48-869494	N-F-N; type M9494	R50	6-129860	56
4	48-869404	P-N-P; type M9404	R101 thru	18-83083G16	var: 25k ±30%
	48-869456	N-F-N; type M9456	104	1 11 11 10 10	
40	48-869571	P-N-P; type M9571	R105	18-83083G13	var: 10k ±30%
40.7	48-869594	N.F.N; type M9594	R110	6-124B04	180k ±5%
	48-869643	F F. type M9643	R111	6-128683	150k ±5%
	48-869642	: -F-N; type M9642	R112	6-129887	12k ±5%
â.	48-134674	N-F-1 type M4674	R113	6-129669	4.7k ±5%
_ 04 . i z	48-869494	N-P-1. type M9494	R114	6-129681	1.5k ±5%
20 0	48-809057	N-P-N; type M9657; does not	R116	6-129225	10k
		incl. 4-84910A01 INSULATOR	R117	6-129526	33k ±5%
		transistor mounting	R118	6-129982	5.6k ±5%
2	48-869657	N-P-N; type M9657; does not	R119	6-124A19	56 ±5%
		incl. 4-84910A01 INSULATOR	R120	6-124A27	120 ±5%
		transistor mounting,	R121	6-131276	150 ±5%
		26-84024B01 RADIATOR.	R122	6-124A05	15 ±5%
		transistor heat sink (cooling	R123	6-131524	100 ±5%
		collar)	R124	6-124A09	22 ±5%
Q108	48-869780	N-P-N; type M9780	R125	6-124A27	120 ±5%
Serve.	48-869587	N-P-N; type M9587	R126	6-129299	68k ±5%
2116 thru .12		N-P-N; type M9583	R127	6-129805	lk ±5%
Q113	48-869576	N-P-N; type M9576; does not	R180	6-124C43	560
		incl. 14-84268A01 INSULA-	R181	6-129820	I.8k ±5%
		TOR, transistor mounting	R182	6-129805	1k ±5%
		4-84152B01 WASHER, insulat	R183	6-131526	18k ±5%
		ing; shoulder type; 2 req'd	R184	6-129226	100k
Q114			R185	6-128903	39k
Q115	48-869570	N-r-N; type M9570	R186	6-129662	180
Q116	48-869571	P-N-P; type M9571	R187	6-127805	15k
Q117	48-869570	N-P-N; type M9570	R188	6-129235	1.2k
Q118	48-869440	N-F-N; type M9440	R189	6-131526	18k ±5%
Q119 thru	48-869494	N-P-N; type M9494	R 190	6-129232	3.9k (single freq. models
121				or 6-128687	6.8k (multi-freq. models
Q301	48-869571	P-N-P; type M9571	R191	6-129433	5.6k
Q302 thru	48-869570	N-P-N; type M9570	R192	6-127803	1.5k
305			R193	6-129667	22k ±5%
2306	48-869571	P-N-P, type M 45 1:	R194	6-129668	10k ±5%
Q307 thru	48-869570	N-P-N; type M9570	R195	6-131527	47k ±5%
309			R196	6-129669	4.7k ±5%
Q340	48-869571	P-N-P; type M9571	R200	6-124C53	1.5k
Q341, 342	48-869570	N-P-N; type M9570	R301	6-127803	1.5k
Q343, 344	48-869872	F-N-F, type M9872; does not	R302	6-127801	470
		inc. 14-84210A01 INSULATOR,	R303	6-129752	270
		transistor mounting	R304	6-129433	5.6k
Q345	48-869571	P-N-P; type M9571	R305	6-127802	1k
Q346	48-869467	P-N-P, type M9467	R306, 307	6-128687	6,8k
Q347	48-869571	F-1-F, type M9571	R308	6-127801	470
C348	48.869257	F-:F; type M9257	R309	6-127802	lk
Q701	48-869329	\-r-\; type M9329	R310	6-127803	1.5k
0702	48-869571	P-1-r, type M9571	R311	6-129752	270
Q703	48-869328	P-:P; type M9378	R312	6-129230	12k
D704	48-869327	F-:F; type M9327	R313	6-127800	220
2705	48-869197	iF-'; type M9197	R314	6-127803	1.5k
2706	48-869570	:-F-'; type M9570	R315	6-129232	3.9k
2707	48-869571	E - 1 - E : type M9571	R316	6-128599	680
751 thru	48-869570	F-N-F; type M9571 N-F-N; type M9570	R317	6-128904	18k
755	.3-007910		R318	6-128686	8.2k
2756	48-869571	P-N-P; type M9571	R319	6-127800	220
2757	48-869570	2 5. N. tope My0/1	R320	6-129231	3.3k
101	40-804310	N-P-N; type M9570	R321	6-128688	3.3K
		V. DOVOM OD ALL ALL ALL ALL ALL ALL ALL ALL ALL AL	R322	6-128599	680
		RESISTOR, fixed: #10%; 1/4 W	R323	6-129232	
		unl. stated	R323	6-129232	3.9k 470
2	6-129753	100	R325, 326	6-127801	
	6-129668	10k ±5%	R325, 326	6-127803	1.5k
3	6-128687	6.8k			1k

	R
ON	
	1
	1 1
	1
	1 :
	1
	1
t	1
1	1
	1
	1
	1
	1 2
	1
	1
	1
	1
	1
	1
	1
	1
	1
	F
-	F
	F
	F
	F
	F
	F
	F
	B
	R
	R
	R
	R
odels only)	R
040107	R
	R
	R
	R
	R
	R
	R
	R
	R
	R
	R
	R
	R R R R
	R
	R
	R/R/
	R/
	R (
	R
	R R
	67
	R6

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
			R678	6-131524	100 ±5%
R328	6-127800	220	R679	6-129735	1.2k
R329	6-127802	1k	R680	6-127803	1.5k
R330	6-129775	330	R681		
R331	6-129433	5.6k	R682	6-131524 6-129886	100 ±5% 27k ±5%
R332	6-129818	820 \$5%	R683	6-127802	
R333	6-129147	220k			1k
R334	6-129433	5.ok	R684	6-129235	1.2k
R335, 336	6-129886	27k ±5%	R685	6-129982	5.6k ±5%
R337	6-128903	39k	R686	6-129805	1k ±5%
R338	6-131858	270k ±5%	R687	6-129708	1.2k ±5%
R339	6-129433	5.6k	R688	6-124A19	56 ±5%
R340	6-129144	68k	R 689	6-131377	15
R341	6-128902	47k	R690	6-3940	5.6k ±5%; 1/2 W
R342	6-127802	1k	R691 thru	6-2036	33; 1/2 W
R343	6-129775	330	694		
R345	6-129804	2.2k ±5%	R695	6-124D61	4.7
R346	6-128688	2.7%	R696L		NOT USED
R347	6-129145	82k	R696M	6-124B55	2.7 ±5%
R348			R696H		NOT USED
	6-127804	4.7k	R701	6-129818	820 ±5%
R349	6-129236	15k ±5%	R702	6-124A39	390 ±5%
R350	6-129804	2.2k ±5%	R703	6-129862	150
R351	6-129237	6.8k ±5%	R704	6-124A72	9.1k +5%
R352	6-124C53	1.5k	R704 R706	6-129887	12k ±5%
R353	6-129237	6.8k ±5%	R707	6-129887	1.5k ±5%
R354	6-129617	120	R707	6-129984	1.5K ±5% 680 ±5%
R355, 356	6-129755	10			
R357	6-129473	330k ±5%	R709	6-129805	1k ±5%
R358	6-129225	10k ±5%	R710	6-129752	270
R359	6-124B55	2.7 ±5%	R711	6-129820	1.8k
R360	6-6291	560; 1/2 W	R712	6-118227	15; 1 W
R361	17-82350A05	0.16; 1 W	R713	6-129777	39k ±5%
R362	6-131446	120k ±5%	R714	6-128683	150k ±5%
R363	6-129887	12k ±5%	R715	6-129886	27k ±5%
R364	6-129984	680 ±5%	R716	6-129669	4.7k ±5%
R365	6-129982	8.2k ±5%	R717	6-129984	680 ±5%
R366	6-128902	47k	R718	6-129887	12k ±5%
R368	6-129232		R719	6-129149	470k ±5%
		3,9k	R720	6-131857	680k ±5%
R369	6-127803	1.5k	R721	6-129707	2.7k ±5%
R370, 371	6-129232	3.9k	R722	6-129806	330 ±5%
R372, 377	6-129225	10k	R723	6-124A31	
R373	6-129232	3.9k	R724	6-129982	180 ±5% 5.6k ±5%
R374	6-128689	2.2k	R725, 728	6-129299	5.0K ±5% 68k
R375	6-124A03	12 ±5%			
R376	6-129753	100	R729	6-128686	8,2k
R378	6-125C19	56; 1/2 W	R730	6-128683	150k ±5%
R430	6-128687	6.8k ±5%	R731	6-129526	33k ±5%
R431	6-129669	4.7k ±5%	R732	6-128987	120k
R432	6-129779	560 ±5%	R733	6-124B12	390k ±5%
R433	6-128687	6.8k ±5%	R735	6-129149	470k ±5%
R434	6-129669	4.7k ±5%	R736	6-129188	820k ±5%
R435	6-129779	560 ±5%	R737	6-129013	1 meg
R436	6-128687	6.8k ±5%	R738	6-129526	33k ±5%
R437		0.0K ±5%	R739	6-128689	2.2k
	6-129669	4.7k ±5%	R740	6-124A74	11k ±5%
R438	6-129779	560 ±5%	R741	6-6373	150
R461	6-129433	5.6k	R751	6-128689	2,2k
R462	6-124BG4	180k ±5%	R752	6-128687	6.8k
R463	6-128683	150k ±5%	R753, 754.	6-129225	10k
R464	6-129887	12k ±5%	755	0-167663	IVA
R465	6-129669	4.7k ±5%	R756	6-131527	47k ±5%
R466	6-129681	1.5k	R756 R757	6-131527	47k ±5% 470 ±5%
R468	6-129433	5.6k			
R469	6-124B04	180k ±5%	R758	6-129667	22k ±5%
R470	6-128683	150k ±5%	R759	6-131527	47k ±5%
R471	6-129887	12k ±5%	R760	6-129709	470 ±5%
R472	6-129669	4.7k ±5%	R763	6-129667	22k ±5%
R473	6-129681	1.5k	R764	6-129225	10k
R475	6-129433	1.5K 5.6k	R766	6-129431	180 ±5%
			R767	6-124A97	100k ±5%
R476	6-124B04	180k ±5%	R768	6-129669	4.7k ±5%
R477	6~128683	150k ±5%	R769	6-129779	560 ±5%
R478	6-129887	12k ±5%	R770	6-129753	100
R479	6-129669	4.7k ±5%	R771	6-129669	4.7k ±5%
R480	6-129681	1.5k ±5%	R772	6-124A97	100k ±5%
R490	17-82586H05	0.1 ±5%; 5 W	R773	6-131527	47k ±5%
R600	6-129754	33	R/13	6 130904	2 21-450
R601L	6-5660	180; 1/2 W	R774	6-129804	2.2k ±5%
R60IM			R775	6-124A13	33 ±5%
R601H	6-6270	220; 1/2 W	R776	6-129225	10k
R602	6-5614	56; 1/2 W	R777	6-128689	2.2k
		100, 172 W	R778	6-129669	4.7k ±5%
	6-6326	100; 1/2 W	R779	6-129147	220k
	17-890466	1.5; 1/2 W	R781	6-129669	4.7k ±5%
R604	6-5621	10; 1/2 W	1	10,00,	
R603 R604 R605	17-890466	1.5; 1/2 W			THERMISTOR:
R604 R605 R650, 651		4.7		6-82990E18	190 ohms @25°C
R604 R605 R650, 651					
R604 R605 R650, 651 R652	6-124D61		RT40,	0-82990510	190 onms @25 C
R604 R605 R650, 651 R652 R670, 671		82 ±5%	RT40, 180	0-82990518	190 onths 672.C
R604 R605 R650, 651 R652 R670, 671	6-124D61		180		
R604 R605 R650, 651 R652 R670, 671 R672 thru	6-124D61 6-2035	82 ±5% NOT USED	180 RT430, 431	6-82990E18	190 ohms @25 °C
8604 8605 8650, 651 8652 8670, 671	6-124D61	82 ±5%	180		

R678 R679 R680 6-129735 R680 6-127803 R681 R682 R683 R683 R683 R684 R684 R684 R685 R685 R686 R687 R686 R687 R687 R686 R687 R687	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R679 R680 R681 R681 R682 R683 R683 R683 R683 R684 R685 R685 R685 R686 R686 R686 R687 R687 R687 R687 R688 R687 R688 R687 R689 R689 R689 R689 R689 R689 R689 R689			
R680 6-127803 1.5% 100 ±5% 100	R678	6-131524	100 ±5%
R680 6-127803 1.5k 100 a5% 100		6-129735	1.2k
R082 6-127985 27k ±55, R084 6-1279235 1k 1.2k ±55, R084 6-1279235 1k 1.5% 5.6k ±5% 1k ±5% 1.2k ±5%	R680	6-127803	1.5k
R682 6-127886 27 27 25 27 18 16 128 18 128 28 18 128 28 18 18 128 18 18 18 18 18 18 18 18 18 18 18 18 18	R681	6-131524	100 ±5%
R683	R682	6-129886	27k ±5%
Re85 6-12982 S. 6k as 5% Re87 Re88 6-129805 Re87 Re88 6-129805 Re87 Re88 6-124708 Re89 S. 6k as 5% 1.2k as 5% S. 6k as 5% S.		6-127802	1k
R685 6-12982 5-6.4 = 5% R687 R686 6-129805 1k. = 5% R687 R686 6-129807 R699 R699 R699 R699 R699 R699 R699 R69		6-129235	1.2k
R687 R688 R689 R689 R699 R691 R691 R6961 R6964 R6964 R701 R702 R702 R703 R703 R704 R704 R705 R705 R705 R705 R706 R706 R706 R706 R706 R706 R706 R707 R706 R707 R707		6-129982	5.6k ±5%
R688 6-124A19 R699 6-131377 R699 6-131377 R699 6-124D61 R696M R696L R696M R696L R701 6-124B55 R696M R702 6-124B55 R703 6-124B55 R703 6-124B52 R703 6-124B52 R704 6-124B52 R707 6-124B52 R709 6-124B52 R709 6-124B52 R709 6-124B53 R709 6-124B53 R709 6-129805 R709 6-129805 R709 6-129805 R709 6-129805 R709 6-129805 R710 6-129781 R711 6-129781 R711 6-129781 R711 6-129781 R712 6-129806 R713 6-129806 R714 6-129807 R715 6-129807 R716 6-129807 R717 6-129808 R719 8-128808 R719 8-128808 R719 8-128808 R719 8-129808			1k ±5%
Rés9 6-1940 15, 6k a5%; 1/2 W 33; 1/2 W 6694 6-2036 6-1940 6-2036 6-1940 6-2036 6-1940 6-2036 6-1940 6-2036 6-1940 6-2036 6-1940			1.2k ±5%
R690 he R691 thru R691 thru R691 thru R691 thru R696 he R696 h			56 ±5%
Ré91 thru 694 Ré95 Ré95 Re96L Ré96M Ré95 Re96L Ré96M Ré96M Re96L Ré96M Re96L Re96M R		6-131377	15
664 6-124D61 4.7 NOT USED R695L 6-124B55 NOT USED 2.7 ±5% R696L 6-124B55 NOT USED 2.7 ±5% R701 6-124B55 NOT USED 2.7 ±5% R702 6-124A72 150 55 R703 6-124A72 150 55 R704 6-124A72 12k ±5% 150 R707 6-1279387 12k ±5% 680 ±5% R719 6-129794 15k ±5% 680 ±5% R711 6-129720 1, 5k ±5% 680 ±5% R711 6-128720 1, 5k ±5% 58 R712 6-118277 15k ±5% 58 R714 6-12886 27k ±5% 58 R715 6-12886 27k ±5% 58 R716 6-129886 27k ±5% 58 R718 6-129886 27k ±5% 58 R718 6-129887 27k ±5% 58 R718 6-129886 27k ±5% 58 </td <td></td> <td></td> <td>5.6k ±5%; 1/2 W</td>			5.6k ±5%; 1/2 W
R696L R696H R696H R701 6-12485 NOT USED 2.7 ±5% NOT USED R696H R701 6-124818 2.7 ±5% NOT USED R702 6-124819 2.1 ±5% NOT USED R703 6-124819 2.1 ±5% NOT USED R703 6-129887 R706 6-129887 12k ±5% 12k ±5	694		
R701 6-129818 820 ±5% 870 ±5% 870 ±12882 150 ±5% 870 ±12882 150 ±5% 870 ±12882 ±150 ±150 ±5% 870 ±12882 ±150 ±150 ±5% 870 ±12882 ±150 ±5% 870 ±12882 ±150 ±5% 870 ±12882 ±150 ±5% 870 ±12882 ±18.5% ±5% 8710 ±12882 ±18.5% ±5% 8710 ±12882 ±18.5% ±5% 8710 ±12882 ±18.5% ±5% 8711 ±18.27 ±18.5% ±	R696L		NOT USED
R702 6-1284A39 390 25% 150 R704 6-1286A37 150 8-1286A37 12k 25% 150 8-1286A37 150 8-1286	R696H		NOT USED
R703 6-129862 150 9.11.5% 45% 6-124827 12k.5% 55% 6-125837 12k.55% 6-125827 12k.55% 6-125828 6-125828 12k.55% 6-125828 6-1258		6-129818	820 ±5%
R704 6-129837 9.1k 598 R706 6-129837 12k 25% 887 88707 6-129805 1.5k 25% 680 25% R710 6-129805 1k 45% 680 25% R711 6-129782 270 1.68 W R711 8 6-129827 1k 25% 680 25% R711 6-129782 270 1.68 W R711 8 6-129805 150k 25% 680 25% R711 6-129807 270 1.68 W R711 6-129807 160k 25% 680 25% R715 6-129807 160k 25% 8870 160k 25% 160k 25% 8870 160k 25% 160k 25% 8870 160k 25% 887		6-124A39	390 ±5%
R706 6 -129887 12k ±5% 1.5k ±5% 680 ±5% 1.5k ±5% 1		6-129862	150
R707 R708 R709 G-129805 R710 G-129805 R711 G-129805 R711 G-129820 R711 G-129820 R711 G-129820 R712 G-11827 R713 G-129820 R713 G-129820 R713 G-129820 R714 G-129820 R715 G-129820 R715 G-129820 R716 G-129827 R718 G-129827 R718 G-129827 R718 G-129827 R719 G-129827 R729 R739 R739 G-129827 R739 R739 R739 R739 R739 R739 R739 R73			
R707 6-129681 1.5k ±5% 680 ±5% 1k ±5			12k ±5%
R708 6-129984 680 25% 1k 25% R710 6-12782 1k 25% R710 6-12782 270 1k 25% R711 6-12862 1k 25% R712 6-12862 1k 25% R713 6-12862 1k 25% R714 6-12868 1k 25% R715 6-12868 1k 25% R716 6-129866 R717 6-129866 1k 25% R718 6-129867 1k 25% R719 6-129867 1k 25% R719 6-129866 1k 25% R720 6-12868 1k 25% R720 6-12868 1k 25% R720 6-12868 1k 25% R720 6-12868 1k 25% R721 6-129866 1k 25% R721 6-129866 1k 25% R722 6-128966 1k 25% R723 6-12481 1k 25% R724 6-12987 R725 R725 6-12498 R726 6-128987 R727 6-129149 R728 R738 6-129149 R739 6-12481 R730 6-12481 R731 6-129149 R731 6-129149 R731 6-129149 R733 6-12686 R734 6-129149 R735 6-12687 R736 6-12687 R737 6-127079 R738 6-12687 R739 6-127079 R739 6-127079 R739 R730 6-128709 R739 R730 6-128709 R739 R730 6-128709 R739 R730 6-129709 R730 6-129669 R730 6-129669 R730 6-129669 R730 6-129669 R7370 6-129669 R7371 6-129669 R7371 6-129669 R7372 6-129669 R7373 6-129669 R7374 6-129669 R7377 6-129669 R7377 6-129669 R7378 6-129669 R7377 6-129669 R7378 6-129669 R7379 6-129669 R7379 6-129669 R7379 6-129669 R7379 6-129669 R7370 6-129669 R7370 6-129669 R7371 6-129669 R7371 6-129669 R7372 6-129669 R7373 6-129669 R7374 6-129669 R7377 6-129669 R7378 6-129669 R7378 6-129669 R7379 6-129669 R7379 6-129669 R7370 6-129669 R7371 6-129669 R7371 6-129669 R7372 6-129669 R7373 6-129669 R7374 6-129669 R7375 6-129669 R7376 6-129669 R738 6-129669 R739 6-129669 R73			1.5k ±5%
R710 6-129820 270 R712 6-1182.7 R714 6-129820 15; 1 W R715 6-129831 150k 45% R717 6-12984 6-129757 R718 6-12984 12k 45% R719 6-12984 12k 45% R720 6-131857 R721 6-12985 15k 55% R721 6-12986 15k 55% R723 6-12885 180 55% R724 6-12986 180 55% R725 6-12886 180 55% R726 6-12986 180 55% R727 6-12986 150 55% R728 6-12988 180 55% R729 6-12988 180 55% R731 6-12888 150k 55% R731 6-12888 150k 55% R731 6-12982 150k 55% R731 6-12982 150k 55% R731 6-12982 150k 55% R731 6-12986 150k 55% R732 6-12986 150k 55% R734 6-12976 150k 55% R735 6-12976 150k 55% R736 6-12976 100k 55% R736 6-12970 150k 55% R736 6-12970 470k 55% R737 6-12970 470k 55% R738 6-129667 100k 55% R739 6-12970 470k 55% R739 6-129877 100k 55% R739 6-129877 100k 55% R739 6-129877 100k 55% R737 6-129877 100k 55% R737 6-12986 100k 55% R738 6-12966 100k 55% R739 6-129877 100k 55% R737 6-12986 100k 55% R738 6-12966 100k 55% R739			680 ±5%
R710 6-129820 270 R712 6-1182.7 R714 6-129820 15; 1 W R715 6-129831 150k 45% R717 6-12984 6-129757 R718 6-12984 12k 45% R719 6-12984 12k 45% R720 6-131857 R721 6-12985 15k 55% R721 6-12986 15k 55% R723 6-12885 180 55% R724 6-12986 180 55% R725 6-12886 180 55% R726 6-12986 180 55% R727 6-12986 150 55% R728 6-12988 180 55% R729 6-12988 180 55% R731 6-12888 150k 55% R731 6-12888 150k 55% R731 6-12982 150k 55% R731 6-12982 150k 55% R731 6-12982 150k 55% R731 6-12986 150k 55% R732 6-12986 150k 55% R734 6-12976 150k 55% R735 6-12976 150k 55% R736 6-12976 100k 55% R736 6-12970 150k 55% R736 6-12970 470k 55% R737 6-12970 470k 55% R738 6-129667 100k 55% R739 6-12970 470k 55% R739 6-129877 100k 55% R739 6-129877 100k 55% R739 6-129877 100k 55% R737 6-129877 100k 55% R737 6-12986 100k 55% R738 6-12966 100k 55% R739 6-129877 100k 55% R737 6-12986 100k 55% R738 6-12966 100k 55% R739	R709	6-129805	
R7112 6-118227 15; 1 W 39% a5% 1-129737 R714 6-128683 150% a5% 150% a5% 150% a5% 150% a5% 150% a5% 150% a5% 1716 6-129669 4.7% a5% 680 a5% 1718 6-129694 170% a5% 1729 6-129149 A77% a5% 680 a5% 1729 6-129149 A77% a5% 680 a5% 1729 6-129149 A77% a5% 180 a5% 1729 6-129149 A77% a5% 180 a5%	R710	6-129752	
R714 6-128881 150k a5% R716 6-129869 4.7k a5% R716 6-129867 4.7k a5% 680 a5% R716 6-129867 4.7k a5% 680 a5% R718 6-129867 12k a5% 4.7k a5% 680 a5% R718 6-129867 12k a5% 4.7k a5% 680 a5% R720 6-129707 2.7k a5% 580 a5% R721 6-129807 180 a5% 68k 8.7k a5% 6-129807 180 a5% 68k 8.7k a5% 6-129808 68k 8.7k a5% 6-129808 68k 8.7k a5% 6-129808 68k 8.7k a5% 6-128808 68k 8.7k a5% 6-128808 68k 8.7k a5% 6-128808 68k 8.7k a5% 6-128808 150k a5% 6-12918 8.7k a5% 6-12918 6-128687 6.128687 8.7k a5% 6-128687 6-128687 6.1		6-129820	1.8k
R714 6-128683 150k a5% 6-129669 6-129669 4.7k a5% 6-8 a5% 12k a5% 6-8 a5% 6-129669 6-129669 4.7k a5% 6-8 a5% 12k a5% 6-129669 6-129669 4.7k a5% 6-129669 6-129669 4.7k a5% 6-129669 6-129669 4.7k a5% 6-129669 6-1	R712	6-118227	15; 1 W
R715 6-129866 4.7k ±5% 680 ±5% 12k ±5% 680 ±5%		6-129777	
R7116 6-129669 4.7k ±5% 680 ±5% 12k ±5% 680 ±5% 680 ±5% 12k ±5% 470k ±5% 680 ±5% 12k ±5% 470k ±5% 680 ±5% 12k ±5% 470k ±5% 680		6-128683	
R717 6-129984 680 a5% 12k a5% 8719 6-129149 680 a5% 12k a5% 8729 6-131837 6-129149 680k a5% 6		6-129886	
R718 6 -129887 12k ±5% 680k ±5		6-129669	4.7k ±5%
R719 6-129149 470k a5% 680k a5% 680k a5% 6-121857 6-127070 6-12707	R717	6-129984	680 ±5%
R721 6-127070 2.7% a55% 6-128687 180 a55% 6-128687 873 873 6-128687 873 873 6-128687 873 873 6-128687 873 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 8-12		6-129887	12k ±5%
R721 6-127070 2.7% a55% 6-128687 180 a55% 6-128687 873 873 6-128687 873 873 6-128687 873 873 6-128687 873 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 873 8-128687 8-12	R719	6-129149	470k ±5%
R722 6-129866 6-12481 180 ±5% 5.6k ±5% 6-12481 180 ±5% 5.6k ±5% 6-12481 180 ±5% 5.6k ±5% 6-12481 6-129762 6-128683 180 ±5% 6-129762 6-128683 180 ±5% 6-129762 6-128683 180 ±5% 6-129149 6-128685 120k ±5% 6-128149 8-128149			580k ±5%
R723 6-124A11 180.25% 6-12992			
R724 6-129982 5.6k a5% 68k R725, 728 6-129289 68k 8.2k 8.72k 8.725 68k 8.72k 8.725 68k 8.72k 8.7			
R725, 728 R729 R720 6-128683 6-128683 R731 6-128526 R732 6-128987 R732 6-128987 R732 6-128987 R736 6-128987 R737 6-129188 6-128987 R738 6-129188 6-128952 R739 R739 6-128687 R739 6-128687 R739 6-128687 R731 6-128687 6-128687 6-128687 R731 6-128687 6-128687 R731 6-128687 6-128687 6-128687 R731 6-128687 6-128687 R731 R733 R734 6-128687 6-128687 R735 R735 R736 R737 R737 R737 R738 R738 R738 R738 R738		6-124A31	180 ±5%
R729 6-128686 8.2k 150k ±5% 120k 150k ±5% 150k ±12845 150k ±1	D 725 720	6 120200	
R730 6-129868 150k =5% R732 6-129867 6-129867 120k =5% R735 6-129497 6-129497 820k =5% R736 6-129497 820k =5% R736 6-1291497 820k =5% R737 6-1291497 820k =5% R738 6-1291497 820k =5% R739 6-1291497 820k =5% R740 6-128689 2.2k 11k =5% R741 6-1373 6-128689 2.2k 1752 6-128689 2.2k 1752 6-128689 2.2k 1752 6-128689 2.2k 1752 6-128689 820k =5% 1752 6-128687 820k =5% 1752 6-128687 820k =5% 1752 6-128687 820k =5% 1755 6-131527 8757 6-129709 820k =5% R753 6-129667 100k =5% R754 6-129667 100k =5% R756 6-129709 820k =5% R756 6-129667 100k =5% R757 6-129779 820k =5% R758 6-129667 100k =5% R758 6-129669 4.7k =5% R759 6-129779 820k =5% R759 6-129779 820k =5% R759 6-129779 820k =5% R758 6-129669 4.7k =5% R776 6-129769 100k =5% R777 6-128689 100k =5% R777 6-128697 100k =5% R777 6-128697 100k =5% R777 6-129669 4.7k =5% R777 6-129669 100k =5% R777 6-129669 100k =5% R777 6-129669 100k =5% R778 6-129669 100k =5% R779 6-129669	D 220	6 120696	
R731 6-129526 6 R733 6-124812 6-12987 120k 25% 820k 25% 8		6 120603	150k ±50f
R732 6-128987 6-124912 1206 55% 8735 6-124812 1206 55% 8735 6-124812 8735 6-125149 8735 6-125149 8736 8736 8737 6-125149 8736 8737 8736 6-125149 8736 8736 8737 8731 8-12525 8-126887 8736 8-12525 8-126887 8736 8-12525 8-126887 8736 8-12525 8-126887 8736 8-12525 8-126887 8736 8-12525 8-126887 8736 8-12525 8-12525 8-126887 8736 8-12525 8-125687 8736 8-125687 8737 8-125687 8-125			
R733 6-124812 370k ±5% 6-129188 6-129189 6-129189 820k ±5% 820k ±128687 820k ±5% 820			
R735 6-129149 470k ±5% 820k ±5% 1 meg 820k ±5% 1 me			
R716 6-129188 6-129526 820k ±5% 6-129613 1 meg 31k ±5% 6-129613 1 meg 31k ±5% 6-128687 8739 6-128687 1 1k ±5% 6-128687 8755 - 6.128687 6.8k 6.755, 754, 6-12925 1 10k 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8			470k ±5%
R717 6-129013 1 meg 31k ±5% 2.2k 8 1719 6-129526 6-120526 6-120526 8719 6-120526 6-120526 8719 6-120527 11k ±5% 12k ±5% 2.2k 8 11k ±5% 12k ±5% 2.2k 8 11k ±5% 12k ±5% 2.2k 8 11k ±5% 12k ±5% 6-120525 10k 2.2k ±5% 6-120525 10k 2.2k ±5% 6-120525 10k 2.2k ±5% 6-120526 470 ±5% 2.2k ±5% 6-1205667 470 ±5% 2.2k ±5% 6-1205667 470 ±5% 2.2k ±5% 6-120526 10k 2.2k ±5% 12k ±5% 1		6-129188	82.0k ±5%
R738 6-129526		6-129013	1 meg
R739 6-128689 R740 6-6373 150 R751 6-128687 R752 6-128687 R753 754, R753 6-128687 R753 754, R753 6-1287687 R758 6-129667 R758 6-129667 R758 6-129667 R759 6-131527 R759 6-131527 R750 6-129709 R750 6-129709 R750 6-129709 R750 6-129870 R777 6-128687 R777 6-128687 R777 6-128687 R778 6-129669 R777 6-129669 R7778 6-129669 R7779 6-129669 R7779 6-129669 R7770 6-129669 R7770 6-129669 R7770 6-129669 R7771 6-129669 R7770 6-129669 R7770 6-129669 R7771 6-129669 R7770 6-129669 R770 6-129669 R770 6-129669 R770 6-129669 R770 6-129669 R770 6-129670 R770 6-129669 R770 6-129670 R7	R738	6-129526	33k ±5%
R741 6-6373 6-128689 2.2.k 6.8k 6.753, 754, 755 6-128689 10k 7875. 755 6-128687 10k 7875. 755 755 755 755 755 755 755 755 755		6-128689	2.2k
R741 6-6373 6-128689 2.2.k 6.8k 6.753, 754, 755 6-128689 10k 7875. 755 6-128687 10k 7875. 755 755 755 755 755 755 755 755 755	R740	6-124A74	11k ±5%
R751 6-128689 6.8k 6.8k 10k 755 6.8k 10k 10k 10k 10k 10k 10k 10k 10k 10k 10	R741	6-6373	
R752. 54. 6-12925 10k 755 756 6-131527 47k 45% 47k 45% 47k 45% 47c	R751	6-128689	2.2k
R753, 754, 754 7755 8756 8756 8757 8758 86-129709 8758 86-129567 8758 86-129567 8758 86-129567 8758 86-129567 8758 8759 8758 8759 8758 8758 8758 875		6-128687	6.8k
755 8757 6-131527 47k ±5% 470 ±5% 8757 6-129709 8-12967 8759 6-131527 47k ±5% 8759 6-131527 47k ±5% 8759 6-131527 47k ±5% 470 ±5% 8764 6-129725 100 ±5% 8764 6-129725 100 ±5% 8766 6-129491 100 ±5% 8766 6-12969 8769 6-129779 8770 6-129473 100 ±5% 8771 6-129569 4.7k ±5% 8771 6-129569 100 ±5% 8771 6-129569 100 ±5% 8771 6-129569 100 ±5% 8771 6-129569 100 ±5% 8771 6-129569 100 ±5% 8771 6-129569 100 ±5% 8771 6-129569 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 6-129669 100 ±5% 8771 871 871 871 871 871 871 871 871 87		6-129225	10k
## 2756 6 -131527 47% 45% 45% 470 45% 6 -129769 470 45% 78 55% 6 -129667 47% 45% 78 55% 6 -131527 47% 45% 78 55% 6 -131527 47% 45% 78 55% 6 -129667 470 45% 78 55% 78 56 -129667 10% 78 56 -129617 10% 45% 78 56 -129617 10% 45% 78 56 -129617 10% 45% 78 56 -129617 10% 45% 78 56 -129617 10% 45% 78 56 -129617 10% 45% 78 56 -129617 10% 45% 78 7716 6 -129783 100 45% 78 7716 6 -129783 10% 45% 78 7716 6 -129617 10% 45% 78 7716 6 -129617 10% 45% 78 7716 6 -129617 10% 45% 78 7717 6 -129667 10% 45% 78 7717 6 -129667 10% 6 -129147 10% 45% 78 7717 6 -129669 4 4.7% 45% 6 -129669 10% 40% 40% 40% 40% 40% 40% 40% 40% 40% 4			
R758 6-129667 22k ±5% 47k ±5% 6-129267 47k ±5%		6-131527	47k ±5%
R758 6-129667 22k ±5% 47k ±5% 6-129267 47k ±5%		6-129709	470 ±5%
R759 6-131527 47k ±5% 675 6-12709 R763 6-128709 470 ±5% 8764 6-128709 100k ±5% 8764 6-128725 10k ±5% 8765 6-12864 100k ±5% 8765 6-12864 100k ±5% 8766 6-12864 100k ±5% 8766 6-12864 100k ±5% 8767 6-12864 100k ±5% 8770 6-128779 100k ±5% 8771 6-12864 100k ±5% 8771 6-12845 100k ±5% 8771 6-131527 47k ±5% 8771 6-131527 2.2k ±5% 8766 8-12864 100k ±5% 8776 6-12866 100k ±5% 8776 6-12866 100k ±5% 8776 6-12866 100k ±5% 8776 6-12866 100k ±5% 8777 6-12868 100k ±5% 8777 6-12866 100k ±5% 8777 6-12866 100k ±5% 8777 6-12866 100k ±5% 8779 6		6-129667	22k ±5%
R763 6-129467 22k 45% FR764 6-129265 10k 180 45% FR765 6-1294811 180 45% FR767 6-124481 1100k 45% FR767 6-124481 100k 45% FR768 6-124779 560 45% FR770 6-129779 500 45% FR771 6-129569 4.7k 45% FR772 6-12487 100k 45% FR773 6-12487 100k 45% FR774 6-12487 100k 45% FR774 6-124813 33 45% FR774 6-124813 33 45% FR777 6-124813 22.2k 45% FR777 6-129487 2.2k 45% FR778 6-129469 4.7k 45% FR778 6-129469 4.7k 45% FR779 6-129469 12.2k 180 56% FR779 6-129467 180 56% FR779 6-129469 180 56% FR779	R759	6-131527	47k ±5%
R763 6-129467 22k 45% FR764 6-129265 10k 180 45% FR765 6-1294811 180 45% FR767 6-124481 1100k 45% FR767 6-124481 100k 45% FR768 6-124779 560 45% FR770 6-129779 500 45% FR771 6-129569 4.7k 45% FR772 6-12487 100k 45% FR773 6-12487 100k 45% FR774 6-12487 100k 45% FR774 6-124813 33 45% FR774 6-124813 33 45% FR777 6-124813 22.2k 45% FR777 6-129487 2.2k 45% FR778 6-129469 4.7k 45% FR778 6-129469 4.7k 45% FR779 6-129469 12.2k 180 56% FR779 6-129467 180 56% FR779 6-129469 180 56% FR779		6-129709	
R766 6-124941 100 ±5% 100 ±5% 100 ±5% 100 ±5% 100 ±5% 100 ±5% 4.7 ±5% 560 ±5% 6-129779 770 6-129783 100 ±5% 4.7 ±5% 6-129769 7772 6-124497 100 ±5% 4.7 ±5% 6-131527 47% ±5% 6-131527 47% ±5% 6-124213 33 ±5% 6-124213 33 ±5% 6-124213 100 ±5% 6-1242	R763	6-129667	22k ±5%
R767 6-124A97 100k ±5% R768 6-129669 4.7k ±5% 560 ±5% R769 6-129779 560 ±5% R777 6-129783 100 ±5% R771 6-129783 100k ±5% R772 6-124A97 100k ±5% R773 6-131527 47k ±5% R773 6-131527 47k ±5% R775 6-12947 33 ±5% 2.2k R776 6-12947 2.20k 4.7k ±5% R778 6-129469 4.7k ±5% R779 6-129469 4.7k ±5%	R764	6-129225	10k
R767 6-124A97 4.7k ±5% 560 55% 7779 6-129749 4.7k ±5% 560 55% 7770 6-129759 100k ±5% 6-129759 100k ±5% 6-129759 100k ±5% 6-124A97 100k ±5% 6-124A97 100k ±5% 6-124A13 33 ±5% 6-124A13 33 ±5% 6-124A13 33 ±5% 6-124A13 6-129669 4.7k ±5% 6-129147 6-129669 4.7k ±5% 6-129147 6-129669 100k 6-129147 100k ±5% 6-129147 100k 6-129147 1			
R768 6-129769 R770 6-129779 R770 6-1297753 R771 6-129669 R771 6-129669 R771 6-129669 R772 6-131527 R774 6-131527 R774 6-131527 R775 6-131527 R776 6-12925 R776 6-12925 R776 6-129215 R776 6-129215 R777 6-129669 R778 6-129669 R778 6-129669 R779 6-129669 R779 6-129669 R779 6-129669 R770 6-129669		6-124A97	100k ±5%
R769 6-129779 550 25% 25% 27779 6-129783 100 4.7% 25% 2771 6-129783 100 4.7% 25% 2771 6-129669 4.7% 25% 27.2% 25% 27.2%		6-129669	4.7k ±5%
R771 6-129669 4.7k ±5% 100k ±5% 100k ±5% 100k ±5% 173 6-124897 100k ±5% 47k ±5% 2.2k ±5% 100k ±5% 47k ±5% 2.2k ±5% 3.3k ±5% 3.3k ±5% 3.3k ±5% 2.2k ±5% 2.2k ±5% 2.2k ±5% 2.2k ±6% 6-12946 4.7k ±5% 2.2k ±777 6-129669 4.7k ±5% 6-129167 2.20k 4.7k ±5% 6-129167 180 6.2990£18 190 6.25°C 190 6.2990£18 190 6.25°C 19	R769	6-129779	560 ±5%
R771 6-129669 4.7k ±5% 100k ±5% 100k ±5% 100k ±5% 173 6-124897 100k ±5% 47k ±5% 2.2k ±5% 100k ±5% 47k ±5% 2.2k ±5% 3.3k ±5% 3.3k ±5% 3.3k ±5% 2.2k ±5% 2.2k ±5% 2.2k ±5% 2.2k ±6% 6-12946 4.7k ±5% 2.2k ±777 6-129669 4.7k ±5% 6-129167 2.20k 4.7k ±5% 6-129167 180 6.2990£18 190 6.25°C 190 6.2990£18 190 6.25°C 19		6-129753	
R773 6-131527 47k ±5% 2.2k ±5% 8775 6-124A13 33.55% 10k 2.2k ±5% 10k 2.2k ±5% 10k 2.2k ±5% 10k 2.2k ±64.726 4.7k ±5% 2.2k 4.7k ±5% 2.2k 4.7k ±5% 2.2k 4.7k ±5% 2.2k 5.2k 5.2k 5.2k 5.2k 5.2k 5.2k 5.2k		6-129669	4.7k ±5%
R774 6-129804 2.2.k ±5% 78.775 6-124313 33.5% 10k 78.777 6-128689 10k 78.777 8-128689 2.2.k 2.7 k ±5% 78.778 6-129569 4.7k ±5% 78.781 6-129467 2.20k 4.7k ±5% 78.781 6-129469 10k 78.785% 78.785% 78.7840, 6-82990£18 190 chms @25°C			
R774 6-129804 2.2.k ±5% 78.775 6-124313 33.5% 10k 78.777 6-128689 10k 78.777 8-128689 2.2.k 2.7 k ±5% 78.778 6-129569 4.7k ±5% 78.781 6-129467 2.20k 4.7k ±5% 78.781 6-129469 10k 78.785% 78.785% 78.7840, 6-82990£18 190 chms @25°C		6-131527	47k ±5%
R775 6-124A13 33.45% 6-12925 10k 2.2k 6-12925 10k 2.2k 6-129169 4.7k ±5% 2.20k 6-129147 6-129147 6-129147 4.7k ±5% 2.20k 6-129147 6-129169 4.7k ±5% 2.20k 6-129169 6-129169 190 ohms @25°C 180 R7430, 431 6-82990E18 190 ohms @25°C		6-129804	2.2k ±5%
R776 6-129225 10k R777 6-128689 2.2,2k R778 6-128569 4.7k ±55 R779 6-129147 2.20k R781 6-129147 4.7k ±55 R740, 6-129147 190 chms @25°C THERMISTOR: 190 chms @25°C		6-124A13	
R777 6-128689 2.2,2k 4.7k ±5% 4.7k ±5% 2.20k 4.7k ±5% 4.7k ±		6-129225	
R779 6-129147 220k R781 6-129669 4.7k ±5% THERMISTOR: 180 180 190 ohms @25°C	R777	6-128689	2.2k
R781 6-129669 4.7k ±5% R740, 6-82990E18 190 ohms @25°C R7430, 431 6-82990E18 190 ohms @25°C	R778		4.7k ±5%
THERMISTOR: 180 RT430, 431 6-82990E18 190 ohms @25°C			
RT40, 6-82990E18 190 ohrns @25°C 180 RT430, 431 6-82990E18 190 ohrns @25°C	R781	6-129669	4.7k ±5%
RT40, 6-82990E18 190 ohrns @25°C 180 RT430, 431 6-82990E18 190 ohrns @25°C			
RT40, 6-82990E18 190 ohrns @25°C 180 RT430, 431 6-82990E18 190 ohrns @25°C			THERMISTOR:
RT430, 431 6-82990E18 190 ohms @25°C		6-82990E18	190 ohms @25°C
	180		
	D.T. 425 12	4 920000000	100 above 635 to
	RT430, 431 432,	U-0279UE18	1,4 ourns 672.C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

RV340	6-858401	VARISTOR: 17.2k ohms ±10%; 8.8V @25°C
T1 T2	24-83879G07 24-83879G03	TRANSFORMER, RF: coded VIO; incl. tuning core coded ORG; incl. tuning core
Т3	24-84946A01	TRANSFORMER, discrimina- tor: 455 kHz; incl. 76-83156H07 CORE, tuning (pri); coded GRN, 76-83156H06 CORE, tuning (sec); coded YEL
T340	25-82058H01	TRANSFORMER, AF: pri: (tapped); res 670 ohrns maximum (tap color coded) sec: (tapped); res 13 ohrns
T343	25-83492G02	maximum
T640	24-84465C01	maximum
T650L, T650M	Z4-80906A90	TRANSFORMER, RF: coupling loop; consists of 2 wires within plastic tubing; loop length 2-1/2"
T650H	24-80906A91	coupling loop; consists of 2 wires within plastic tubing; loop length 2"
T651	25-84022B01	pri: 2 coils, 1-3/4 turns each sec: 4-1/4 turns
XQ343, XQ344	9-83817K01	SOCKET; transistor
XY1 thru 4, XY101 thru 104	1-80709B61	SOCKET, crystal: 4-contact
Yl thru 4	K1018A	CRYSTAL UNIT, quartz: (SEE NOTE II) receiver 1st osc.; "plug-in" type; ±,0005% freq. stability
Y5	48-84863B01	receiver i-f bandpass filter: 11.7 MHz center frequency
Y6	G22	receiver 2nd osc.; 11,245 MHz (low-side injection) receiver 2nd osc.; 12,155 MHz
Y101 thru	KXN1002A	(high-side injection) transmitter osc.; "plug-in"
104 Z1	TFN1000AS	type FILTER, IF bandpass: 455 kHz center frequency
Z2 Z3	51-82142K04 51-82142K03	RESISTOR NETWORK: 6-pin 7-pin
Z601L 2601M	TFE6153A TFE6154A	FILTER, RF: low-pass; 450-470 MHz 470-494 MHz
Z601H	TFE6155A	494-512 MHz
	NON-REFERENCE	
	26-84598A01	SHIELD, coil: used with L9, 10, 11, 12, L102 through 106
		SHIELD, discriminator used
	26-82451G01	with L312, L313, T3
	26-83875G03 26-82072G04	with L312, L313, T3 SHIELD, coil: used with L6(B), T1
	26-83875G03	with L312, L313, T3 SHIELD, coil: used with L6(B), T1 SHIELD, coil: used with L7, 8 and T2 BRACKET, "hinge"; (for
	26-83875G03 26-82072G04	with L312, L313, T3 SHIELD, coil: used with L6(E), T1 SHIELD, coil: used with L7, 8 and T2

REFERENCE SYMBOL	PART NO.	DESCRIPTION	

}	7-84691C01	BRACKET, grounding: for grounding coaxial shields on
	43-82721C03	RF deck BUSHING, screw retaining:
	3-135111	"snap-in" type; 2 req'd SCREW, tapping: 4-40 x 3/8"
	3-84048B01	"Phillips" hex head; 2 req'd SCREW, machine: 10-32 x 3/8" slotted hex head:
	1	"captive" type; 2 req'd
	42-82388C02	WASHER, screw retaining: ("C" washer): 2 reg'd
	39-84680B01	SPRING, grounding contact: (used under heads of board
		mounting screw); 6 req'd
	2-84976A01	NUT, machine: round:
	2-84970401	slotted; for mounting Q108 through 112
	26-84020B01	RADIATOR, heat sink
	3-135031	SCREW, machine: 10-32 x 3/8" slotted hex head: 2 reo'd
	4-7652	LOCKWASHER: No. 10 exter- nal: 2 reg'd
	42-82234G01	"O" RING: neoprene; used as captivator for radiator holding screws: 2 req'd
	14-84859B01	INSULATOR, treated paper: (for PA circuit board mount-
	14-83485C01	ing) SOCKET, "Vibrasponder"
		resonant reed: 4-contact
	15-84345C01	PLATE, cover (Power Tripler)

NOTE.

- I. Replacement diodes and transistors must be ordered by Motorola part number only for optimum per-formance.
- H. When ordering crystal units, specify carrier frequency, crystal frequency and crystal type number.

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
---------------------	---------------------	-------------

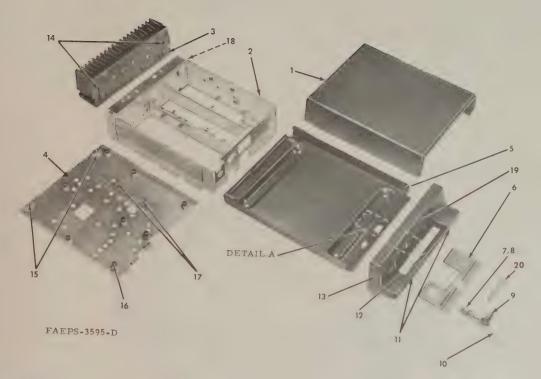
The	following are	electrical	components	uniqu		
	"A" Suffix M	aun Circuit	Board Mode	ls on		

		PL-3639-O
		CAPACITOR, fix-
C1+2	8-82905G16	.056 uF ±5%: 200 \
C185	23-82783B3b	39 pF ±10%; 10 \
C190	8-82905G07	0.1 uF ±10%, 5 %
C191	8-83813H37	.0033 uF ±5 . \
C196	8-82987E07	0.12 uF ±10' ~
C1+7	21-861436	100 pF ±10% 75 %, %74
C 347, 348	8-82905G04	.018 .F =107 . A
C349	5 61393P 3	0,22 3 11 97 5
C352	31-575504	-26 (f = 2 3) 1
C460, 467, 474	a-a2905G07	0.1 uF ±10% 51.
		DIODE: (SEE NOTE I)
CP1 153		NOT SED
		TRANSISTOR: (SEE NOTE II
Q100		MC L CE.
	48-869571	PNP, type M9571
Q102	48-869674	NPN; type M9674
Q143,344	48-134584	PNP . re M4584; does not incl.
		14-8 INSULATOR,
		transistor mounting

SOC : ., transustor 2-conta t was not incl. 4-84: WASHER, shoulder

type . req'd.

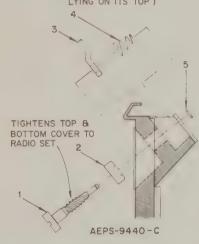
RESULT P NEIWORK



PL-1184-D

		PL-1184-D	
	MOTOROLA		
CODE	PART NO.	DESCRIPTION	
1	15E84920A03	COVER, housing; top	
2	27E84441C03	CHASSIS	
3	26D84020B01	RADIATOR, heatsink (450-	
		470 MHz)	
	or 1V80740B41	RADIATOR, heatsink (470-	
		512 MHz)	
4	15C84491B01	COVER, bottom	
5	15E84920A01	HOUSING, base	
6	13C84921A02	ESCUTCHEON	
7	55-84912A03	LOCK ASSEMBLY (complete)	
* 8	55-84912A01	BARREL AND NUT (P/O code 7)	
8A	55-84912A02	CYLINDER AND KEY (P/O	
		code 7)	
		NOTE: Code 8A (Culinder and	
		Key) must be removed using	
		code item 10 (TOOL, lock-	
		cylinder removal) before the	
		front panel can be removed.	
9	55-893872	KEY (P/O code 7)	
10	66A84909B01	TOOL, for removal of lock	
11	3S125457	SCREW, special; for handle	
12	55C84909A01	HANDLE	
13	1V80708B66	FRONT PANEL, does not incl.	
1 4	3S135031	code 7, 11, 12 SCREW, special	
14	42A82234G01	RETAINER	
	4S115362	LOCKWASHER	
15	3B84048B01	SCREW, special	
13	42A82388C02	RETAINER	
	4S115362	LOCKWASHER	
16	75A84962A01	BUMPER, rubber	
17	43B82721C03	BUSHING, snap	
	3S135111	SCREW, tapping: No. 4-40 x	
18	14C84656C01	RETAINER, tuning tool	
19	3-138806	SCREW, machine: 8-32 x 5/16"	
20	55-84530B01	BOLT, locking (nylon)	

DETAIL A (VIEWED WITH RADIO SET LYING ON ITS TOP)

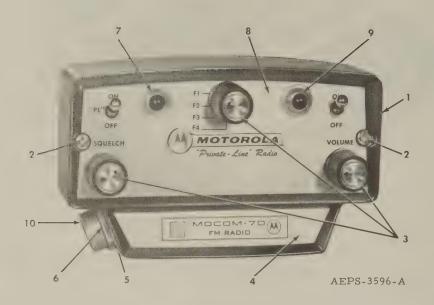


CODE MOTOROLA PART NO.		DESCRIPTION	

Front Panel L	Latching Kit	PL-1943-0
*1 2 *3 4 5	3B84460G01 4A84362B01 45B84461G01 41A822468 42A82388C03	SCREW, latching WASHER, cup CAM, latching SPRING, Locking plate RING, retaining ("E" type)

* Codes 1 & 3 must be replaced together

450-470 MHz and 470-512 MHz "Mocom*70" FM Radio
Heat Sink and Housing Detail
Universal Model Radio Set
Motorola No. PEPS-4865-E
8/20/75-PO



PL-931-0

CODE	MOTOROLA PART NO.	DESCRIPTION
1	15D83576D07 or15D83576D03	HOUSING, dash-mount HOUSING, trunk-mount
2	3A82670A07 or3A82670A01	SCREW, special: dash-mount SCREW, special: trunk-mount
3	36B82629H02 or36K858652	KNOB, control; dash-mount KNOB, control; trunk-mount
4	33B83646D07 or33C83646D08	NAMEPLATE (dimmer)
5	4S7699 2A482070	WASHER, lock; 13/16" INT.
7	61B83678D01 13D857971	LENS, indicator light (RED) ESCUTCHEON, 1 freq. (carrier
	or13K857972	squelch) ESCUTCHEON, 2 freq. (carrier squelch)
	or13D82286C23	A CONTRACTOR OF THE CONTRACTOR
	orl3K857975	ESCUTCHEON, 1 freq. ("Private-Line")
	orl3K857976	ESCUTCHEON, 2 freq. ("Private-Line")
	or13D82286C22	'
10	61B83678D02 9K830418	LENS, indicator light (GREEN) CONNECTOR, receptacle: female: 4 contact

Control Head Escutcheon and Housing Detail Motorola No. PEPS-3599-B 8/20/75-PO

REDUCTION OF INTERFERING NOISE IN MOBILE OPERATION

1. INTRODUCTION

Noise generated by the electrical system of the vehicle, as well as local ambient noise, might interfere with normal operation of two-way mobile radios. To overcome these interferences, various noise reduction procedures are required. These requirements vary from one vehicle to another, depending on system frequency, vehicle type and required coverage area. If the operating area is sufficiently small (received signal levels always high), less noise reduction is required. Conversely, for maximum range coverage and operation into weak signal areas, noise reduction becomes very important.

Before attempting any noise reduction procedures, determine the noise source. Then, follow a systematic method of elimination until the interference is removed or appreciably reduced.

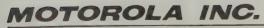
2. NOISE REDUCTION

a. Noise Reduction Kits

The Model TLN8845A Noise Reduction Kit is available for all vehicles equipped with two-way radios. For vehicles with generators or with severe noise problems, Model TLN6252A Noise Reduction Kit is recommended. See Figures 1 and 2.

b. General Information

Impulse noise is most noticeable in installations of narrow bandwidth receivers because of ringing associated with the steep-sided selectivity characteristics. This equipment has been designed to minimize the ringing effect of impulse noise as much as possible.



Communications Division
SCHAUMBURG, ILLINOIS 60172

1301 E. ALGONQUIN ROAD

ENGINEERING PUBLICATIONS

68 P8 1023 E42-A

Reference Number	Quantity	Motorola Part Number	Description
1 2 3 4 5 6 7	3 1 1 3 1	1 V839913 1 V80700A88 8C82571B02 8C82571B01 1 V80700A89 30A502396 1 V80700A91	Lead & Lug Assembly Lead & Lug Assembly Capacitor, Coaxial (.1 uF - 100 V) Capacitor, Coaxial (.5 uF - 100 V) Generator Field Suppressor Assembly Ignition Coil Suppressor Cable Hood Wipers and Mounting Kit Hardware

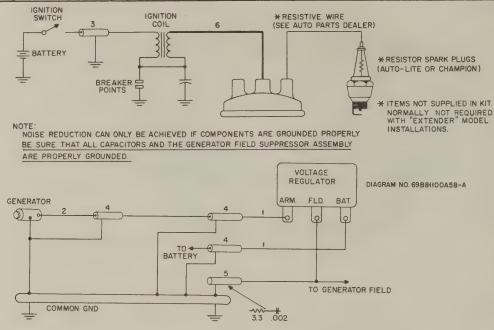


Figure 1. Typical Noise Reduction Detail Using TLN6252A Noise Reduction Kit

TLN8845A NOISE REDUCTION KIT

Quantity	Motorola Part Number	Description
1	1 V839913	Lead & Lug Assembly
1	8C82571 B02 30A502396	Capacitor, Coaxial (.1 uF, 100 V) Ignition Coil Suppressor Cable
1	1V80782A52	Hood Wipers and Mounting Hardware Kit

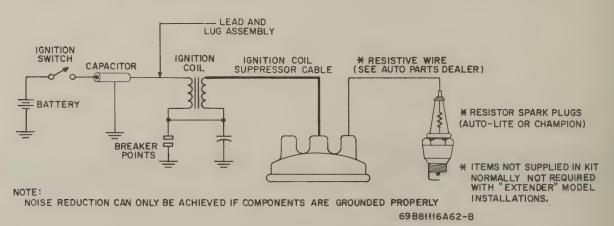


Figure 2. Typical Noise Reduction Detail Using TLN8845A Noise Reduction Kit

The useful range of radio receivers can be seriously affected by noise interference which prevents the reception of a clear, easily-understandable signal. A certain amount of noise interference may be tolerated when operating in a strong signal area. However, in weak signal areas such as fringe area operation, serious noise interference can cause a complete failure in reception.

c. Noise Sources

The source of noise can generally be determined by its sound in the speaker. For best results in locating noise, the unit should be receiving a weak signal which produces not less than 10 dB nor more than 30 dB noise quieting.

Noise interference is usually traced to one of the following sources:

(1) Ignition Noise

An automobile electrical system provides the primary source of electrical interference to radio communications in mobile installations. Radio interference can be generated in the spark plugs, distributor contacts, generator armature, voltage regulator, electrical gauges, wheel static and any part of the car where friction may exist due to intermittent contact between any two members of the car's mechanical structure.

In a mobile installation, the prime source of electrical interference with radio communications is in most cases the result of a spark discharge or arc created in the electrical system. Whenever a spark discharge takes place through air, high frequency oscillations are generated in a range of frequencies from a few kilohertz to hundreds of megahertz. These oscillations are generally radiated and therefore received through the antenna. However, they may also be induced in associated wiring and transferred to other electrical wiring in the system including that of the radio installation.

Suppressing all arcing that can develop in the electrical system may pose a difficult problem. For example, in an 8 cylinder engine operated at 2000 RPM, arcing in the engine system can be at the rate of 8,000 spaks per minute or 133 per second. These arcs, after being extended because of ringing, can create a blanket of noise which will block out weak signals at the radio receiver.

(2) <u>Impulse noise interference generated</u> by the vehicle electrical system.

This type of interference is generated by commutator and brush action, vibration of electrical contacts and electrical arcing or sparking. This broad-band interference may be propagated via space radiation.

The impulse noise enters the receiver through the antenna and serious interference in the form of tuned circuit "ringing" results even though the impulse may be very brief. "Ringing" may be defined as the shock excitation of a tuned circuit caused by an impulse which extends the duration of the impulse. It is the "ringing", caused by the impulse rather than the impulse itself, which is troublesome.

(3) Noise produced by flourescent lights, electric motors, electric fences, induction from power lines and similar sources.

This type of interference is generally AM in nature, excluding capture effect. Normally, if signal strength is adequate, all such noise is removed from a received carrier by effective limiting action. Also, a vehicle is able to move out of a high noise level area if this type of noise interferes with radio reception. Thus, such conditions may be tolerated.

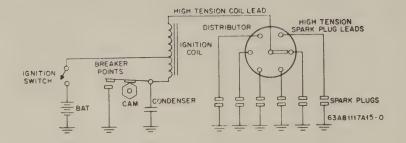
NOTE

Thermal agitation noise and noise produced in the receiver have been taken into consideration in the original design of the equipment. Any well designed mobile radio unit will not present any serious problems in this respect.

d. The Ignition System

In order to effectively reduce ignition interference in a car, it is well to understand the operation of an automobile ignition system.

Ignition is necessary in a gasoline engine to ignite the gasoline vapor and the air mixture in its cylinders. The system is made up of the battery, distributor, breaker points, coil, condenser and spark plugs. The battery is the only electrical source of power in an automobile, so the low battery voltage must be stepped up to the high voltage necessary to arc across the spark plug electrodes. This arc ignites the gas mixture.



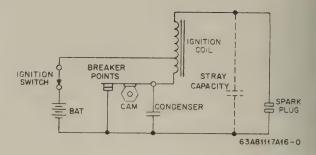


Figure 3.

Typical Vehicular Ignition System,

Schematic Diagram

In the conventional ignition system (Figures 3 and 4) a mechanical circuit breaker (points in the distributor) opens the primary circuit of the ignition coil. By transformer action in the coil, high voltage is developed at the coil secondary. This high voltage is synchronized and applied to each spark plug by the distributor.

The battery is connected to the primary winding of the coil through the ignition switch. The primary circuit is returned to the battery through the breaker points, which are bypassed by the condenser. The points are normally closed. As the cam shaft is rotated by the engine, its lobes or corners open and close the points in proper synchronization with each cylinder.

With the ignition switch on and the breaker points closed, coil primary current builds up at a rate determined by coil inductance.

When the breaker points open, primary current decreases and by self-induction, an EMF is induced in the primary which is many times greater than the battery voltage. The high voltage induced in the coil secondary causes a spark across the spark plug gap for a short interval of time. When the breaker points open, the condenser reduces arcing of the points.

The secondary circuit of the ignition coil, including the spark gap, is much like a spark transmitter used in the early days of radio. It is the main source of ignition interference. All that is needed to simulate the spark transmitter is an inductance and capacitance in series with the spark gap. The lead inductance and stray

Figure 4.

Typical Vehicular Ignition System,

Simplified Schematic Diagram

capacitance provides a tuned circuit. Because the discharge of the circuit is through a low resistance (ionized spark gap), the circuit tends to oscillate. The frequency and amplitude of oscillation that is developed vary as current changes in the spark gap.

e. Noise Reduction Technique

It has long been known by ignition engineers that the addition of a series resistance adjacent to a spark discharge will damp out the troublesome oscillation which causes interference. The type of spark plug suppression used in noise reduction should always be in accordance with the recommendations of the car manufacturer, i.e., if spark plugs are to be replaced with builtin suppressor types, they should be in the proper heat ranges and thread sizes for the particular engine. In each ignition system there is a maximum amount of resistance that may be connected between the distributor and a spark plug. resistance-type ignition wire is used, the length of each wire must be limited so its resistance does not exceed the allowable maximum. In addition to spark plug suppressors or resistance wire, an economical basic kit of noise reduction items can consist of the following: special coaxial capacitors, combinations of resistor and capacitor assemblies and hood wiper springs.

NOTE

In all cases where coaxial capacitors are mentioned, they should not be substituted by standard bypass capacitors; the standard bypass displays a resonance effect at about 2 MHz. The coaxial type is non-inductive and has high attenuation, up into the uhf region.

The importance of such noise reduction items is greatly increased by their application at the right terminal points in the car's electrical system. Following is an outline of the important points to be considered and a step by step procedure for ignition noise reduction.

NOTE

Noise reduction can only be achieved if components are properly grounded. BE SURE THAT ALL CAPACITORS AND THE GENERATOR FIELD SUPPRESSOR ASSEMBLY ARE PROPERLY GROUNDED.

On some vehicles, standard bypass capacitors might have been installed at locations referred to in these instructions. Where the instructions call for coaxial capacitors, remove the standard bypass capacitor and install the coaxial type.

In the development of a noise reduction kit, it was not necessary to include resistance cable or suppressor resistors in the wiring harness. Such items are generally found as a standard part of present day motor vehicles. However, the omission of such items from a basic noise kit does not imply that these items are nonessential to noise reduction. Spark plug noise reduction is one of the most important points to be covered in the elimination of radio interference in any vehicle.

(1) <u>Generator Interference</u> (Generator Equipped Vehicles Only)

The generator is a source of electrical interference frequently blamed on the ignition system. Electrical current passing between the brushes and commutator in the generator creates many small arcs as the armature rotates. Generator noise is characterized by a high pitched "whine" that varies with engine speed. A .5 uF coaxial capacitor should be placed in series with the generator armature to reduce interference.

NOTE

If the vehicle is supplied with an alternator, the capacitor is not necessary.

(2) Voltage Regulator Interference

The modern voltage regulator is a precise mechanism containing three separate control systems operating with breaker contacts.

Vibrating breaker contacts cause arcing which

may result in annoying interference. This interference is usually in the form of erratic popping in the receiver which changes only slightly in frequency with increase in engine speed.

To reduce voltage regulator noise, two .5 uF coaxial capacitors and a resistor-capacitor assembly are used.

CAUTION

Disconnect the battery ground terminal before attempting to connect components to the battery terminal of the voltage regulator.

(3) <u>Ignition Coil Interference</u>

A.1 uF coaxial capacitor should be placed at the BAT side of the ignition coil to eliminate impulses from the low voltage leads. (Refer to Figures 1 and 2.)

(4) <u>Distributor Interference</u>

Sparking in the distributor itself is a source of radio interference. As the rotor rotates in the cap, sparking occurs between the rotor and the distributor cap inserts. An effective way to reduce this interference is to use resistance-type ignition wire to connect the distributor cap to the ignition coil.

(5) Battery Connection

Connecting the radio set primary power lead directly to the battery instead of the starter relay can help to keep noise off the "A" lead. The battery acts as a large capacitor (about 1 farad for 50 amp capacity batteries), and serves as a very effective bypass. The battery ground return should be bonded to the frame. To minimize the possibility of inducing undesirable parallel ground currents, utilize the vehicle frame as a common ground point whenever it is practical to do so.

(6) Hood Wipers

Ground returns for the electrical circuits are provided through the body and frame of the automobile. Differences in conductivity, inadequate bonds between adjacent conductors, and unequal current distributions result in potential differences throughout the vehicle. The miniature arcs thus created can be avoided by eliminating the potential differences. Effective use of copper bonding braid and brass contact wipers as hood bonds will minimize interference from this source.

(7) Ignition System Interference

Ignition Noise can often be reduced by proper engine maintenance and tune-up. The following points should be considered if the noise interference from the ignition system is severe.

- (a) The distributor points and condenser should be in good condition.
- (b) Ignition timing should be properly adjusted.
- (c) The distributor cap and rotor should be replaced at least every 30,000 miles.
- (d) Spark plug wires should make good contact at each end and should be routed as far as possible from low voltage leads.
- (e) Many late-model automobiles are equipped with a shield over the distributor points. Check to see that this shield is in place properly and is securely attached.

f. Additional Noise Reduction Techniques

In some radio installations, it might be necessary to obtain maximum noise reduction. In such installations, the following possible sources of noise interference should be explored and the following appropriate remedy applied.

- (1) Ammeter to battery lead. (Bypass with .5 uF capacitor. Motorola part #8A821889.)
- (2) Gauges, oil signal, gasoline and temperature. (Bypass with .5 uF capacitor. Motorola part #8A821889.)
- (3) Ignition switch. (Bypass with .5 uF capacitor. Motorola part #8A821889.)
- (4) Headlight, tail light, or dome light leads. (Bypass with .5 uF capacitor. Motorola part #8A821889.)
- (5) Accessory wiring, electrical windshield wipers, heater motor, window openers and others. (Bypass with .5 uF capacitors. Motorola part #8A821889.)
- (6) Wheel static. (Use wheel static collector rings on both front wheels. Motorola part numbers 1K534254 Regular Type; 1K563173 Small Type.)

- (7) Acute cases of generator noise. (Install a .5 uF capacitor in series with the armature lead. Motorola part #8A821889.)
- (8) For severe cases of ignition interference, Hallett Ignition Shielding Kits are available through Motorola on separate order. These special shielded harnesses, available for most automobile and truck engines, provide improved communication in fringe areas and essentially waterproof the ignition system. Supply the following information when ordering Hallett Ignition Shielding Kits.
 - (a) Make and year of vehicle.
- (b) Auto or truck and number of cylinders.
 - (c) Engine cubic inch displacement.
- (d) Type of ignition system: Auto-Lite, Chrysler, etc.

NOTE

Fire truck engine shielding requires more detailed information to assist in supplying the proper kit. Write first for the special "fire truck shielding form" from your nearest Motorola Parts Depot.

(9) A generator-regulator shield is available to further reduce generator and regulator noise. It is not required on alternator-equipped vehicles. Follow the same ordering procedure when requesting this item.

g. Conclusion

The level to which ignition noise interference will need to be reduced will depend on the environmental conditions of operation of the radio system. The factors involved are the strength of the received carrier at various points within range of the fixed station, and the clarity of signals at the fringe areas. However, in most cases ignition noise interference can be substantially reduced, resulting in excellent perform ance of the radio equipment under most operating conditions.

The reduction of ignition noise interference, in many cases, is essential to good system performance. Therefore, it must be given full consideration in the initial installation of the radio

equipment. The components required to successfully reduce ignition noise interference may well prove to be a necessary part of the communications system. Indeed, no mobile radio installation is complete until the remedy for bothersome ignition noise interference has been successfully applied.

Certain noise sources may be isolated to some extent, through consideration of conditions. When the vehicle is standing still with the ignition switch off, any noise heard will probably be external to the vehicle. Static discharge noise will be added when the vehicle is moving. If the vehicle is coasting in gear but with the ignition switch off, generator noise, if present, will be added to the others. Noise produced by inadequate bonding will be most noticeable when maximum current is being drawn from the battery, and may be increased when the vehicle is in motion. Care should be used to be sure that noise tests are made both with and without weak signals.

One effective way to find the hottest sources of interference is to use a pickup loop about one inch in diameter, connected to a radio receiver or oscilloscope powered from a source separate from the vehicle ignition system. Use the pickup loop as a search probe. Be sure the loop has sufficient insulation to prevent the input of the test equipment from coming into direct contact with high voltage points in the vehicle ignition system. This pickup loop technique is also a good way to determine the effectiveness of a particular noise reduction method.

It is impossible to given an exact procedure to counteract noise in all cases; too many variables exist. With an understanding of some of the sources of noise, an intelligent approach will often save considerable time. Ignition noise reduction can add to both operational efficiency and operator satisfaction.

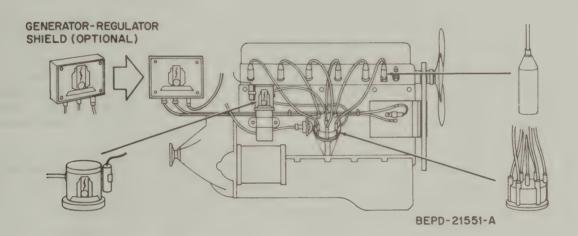


Figure 5. Typical Ignition Shielding Kit

NOISE IDENTIFICATION AND REDUCTION CHART

Characteristics of Noise at Speaker	Source of Noise	How to Check Source of Noise	How to Reduce Noise
Identified as popping sound	Ignition	Noise varies in frequency with engine speed and will disappear when ignition is switched off.	1. Check to be sure: (a) Distributor breaker points and distributor cap are in good condition. (b) Ignition capacitor is in good condition. (c) All ignition system connections are free of corrosion & making good contact. (d) There is dc continuity in high voltage leads. (e) There are sufficiently high spark plug breakdown voltages. (f) Spark plug electrodes are properly spaced and in good condition. 2. Bond each corner of the motor block to chassis ground using a heavy copper grounding braid. 3. Damp the high voltage by installing a resistor suppressor in the distributor rotor lead, or suppressors in the ignition cables or on top of the spark plugs. 4. Install resistor spark plugs or resistance ignition cables.
Identified as a high pitched whine	Generator/ Alternator	Noise varies with engine speed and will persist if ignition is switched off while engine is running at a moderate speed.	Install a .5 uF coaxial capacitor at the generator in series with the armature lead.
Identified as a raspy sound	Voltage Regulator	Look for arcing voltage regulator contacts	Install .5 uF coaxial capacitors, Motorola Part No. 8A821889 at the battery (BAT.) terminal in series with the battery lead and at the generator (ARM) terminal in series with the armature lead.

NOISE IDENTIFICATION AND REDUCTION CHART (Cont'd)

Characteristics of Noise at Speaker	Source of Noise	How to Check Source of Noise	How to Reduce Noise
Identified as raspy sound (continued)			Install RC Filter (1V80700A89) composed of a 3.3 Ohm resistor in series with a .002 uF capacitor (Maximum allowable capacity) in series with the field (F) terminal of the voltage regulator to a common ground.
Identified as a popping sound	Heater and Air Conditioning Fan Motors	With engine off, turn fan motors on and check for noise.	Install .5 uF coaxial capacitor at the motor in series with the battery lead.
Id enti fied as a hissing or crackling sound	Gauges	Noise may be detected by jarring the indivi- dual gauges while the ignition is on.	Install .5 uF bypass capacitors where needed. (Motorola part #8A821889)
Identified as a low- pitch clicking	Oil Sender	Noise rate varies with oil pressure and stabilizes at point of maximum oil pressure.	Install .5 uF bypass capacitor (Motorola Part #8A821889) from gauge lead terminal on oil sender to chassis ground.
Identified as an irregular popping	Wheel Static	Noise disappears when brakes are lightly applied.	Install suitable grounding brushes or springs such as front wheel static eliminators (Motorola Part #1K534254 regular type, 1K563174 small type).
Identified as a more regular or sharper popping sound.	Tire Static	Noise becomes much worse at 30-50 mph.	Use anti-static powder in tires with innerttube.



ANTI-SKID BRAKING PRECAUTIONS

1. GENERAL

The following recommended transmitter installation and test procedures are suggested for vehicles with electronic anti-skid braking systems.

2. INSTALLATION SUGGESTIONS

Locate the braking modulator box in the vehicle. The braking modulator box is located in the trunk in Chrysler Corporation cars and either in the trunk or under the dash in General Motors and Ford Corporation automobiles. A service manual may be helpful to aid in the location of the braking modulator box. Perform transmitter installation in accordance with the following recommended procedures:

- a. If the braking modulator box is mounted on the right side of the vehicle, mount the transmitter on the left side of the trunk to give it as much space as possible between the braking modulator box and the transmitter. If the braking modulator box is mounted on the left side, reverse the procedure.
- b. Use the shortest practical length of Motorola coaxial cable.
- c. The antenna should be mounted on the opposite side of the car trunk from the braking modulator box.
- d. Route all cables along the center or on the opposite side of the vehicle from the braking modulator box.
- e. <u>Do not</u> operate the transmitter while the vehicle is in motion with the trunk lid open.

3. TEST PROCEDURE

This test is divided to cover several different types of interference. Disturbance of the electronic anti-skid device can usually be detected in several different ways concerning the vehicle's braking system, i.e., by the lights, any irregular audible sounds, any change in the performance of the braking system itself, etc.

During checks a. thru f., however, none of the above conditions should be observed if the radio set is properly installed.

- a. With car stationary (gear selector in PARK) and the engine running at a fast idle, key (turn the carrier on and off) the transmitter with and without modulation with your foot off of the brake pedal.
- b. Repeat the preceding with your foot on the brake pedal.
- c. When making this test, while the car is stationary, allow at least 2 car lengths and possibly even more of clear area in front of the vehicle. With your foot on the brake with just enough pressure to keep the vehicle from moving, place the car in a forward gear with the engine at a fast idle, then key the transmitter with and without modulation.

WARNING

Disruption of the anti-skid braking system may cause the vehicle to move forward in addition to the lights and audible sounds mentioned above.

d. Driving at a moderate speed (15-25 mph) with your foot off of the brake pedal, have



Communications Division

SCHAUMBURG, ILLINOIS 60172

9/30/74-PO 52-1 68P81023E43-O

an assistant key the transmitter with and without modulation.

- e. Repeat step 4 with foot slightly on the brake pedal to turn on the brake lights.
- f. While making a moderate deceleration stop from 25-30 mph, have an assistant key the transmitter with and without modulation.

WARNING

Severe disruption of the electronic anti-skid braking system may cause loss of control of the vehicle during the following test.

g. While making "panic" stops from 20 mph have an assistant key the transmitter with and without modulation.

If no interference or disruption is noticed, repeat by making "panic" stops from 30 mph.

If no malfunctions are observed after the above tests are performed, it can be assumed no apparent problem exists and the car can be released to the customer.

If any of the above tests results in a brake malfunction, contact the car manufacturer service department as soon as possible and remove the radio from the vehicle. Do not complete installation.

